SAR TEST REPORT

Equipment Under Test	:	HSPA+ USB Modem
Model No.	:	C330
Applicant	:	BandRich Inc.
Address of Applicant	:	7F, No.188, Baociao Rd., Sindian City, Taipei Country 23146, Taiwan (R.O.C)
FCC ID	:	UZI-C330
Device Category	:	Portable Device
Exposure Category	:	General Population/Uncontrolled Exposure
Date of Receipt	:	2011-03-25
Date of Test(s)	:	2011-03-28 ~ 2011-03-29
Date of Issue	:	2011-04-06
Max. SAR	:	0.509 W/kg (GSM850), 0.921 W/kg (PCS1900) 0.451 W/kg (WCDMA V), 1.29 W/kg (WCDMA II)

Standards:

FCC OET Bulletin 65 supplement C
IEEE 1528, 2003
ANSI/IEEE C95.1, C95.3

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

Tested by	:	**Fred Jeong**	**2011-04-06**
Approved by	:	**Charles Kim**	**2011-04-06**

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APPENDIX

A. DASY4 SAR Report
B. Uncertainty Analysis
C. Calibration certificate

1. General Information

1.1 Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, 435-040, Korea
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371
Homepage : www.kr.sgs.com/ee

1.2 Details of Manufacturer

Manufacturer : FAIR GOAL ELECTRONIC CO.
Address : 1F, No. 97-1, Haihu, Luzhu Township, Taoyuan Country 338, Taiwan (R.O.C.)
Contact Person : Jonas Chuang
Phone No. : 886-3-354-1237

1.3 Version of Report

Version Number	Date	Revision
00	2011-04-06	Initial issue

1.4 Description of EUT(s)

EUT Type	: HSPA+ USB Modem
Model	: C330
Serial Number	: N/A
Mode of Operation	: GSM850, PCS1900, WCDMA V, WCDMA II
Duty Cycle	: 8(GPRS 1Tx Slot), 4(GPRS 2Tx Slot), 2.67(GPRS 3Tx Slot), 2(GPRS 4Tx Slot), 1(WCDMA)
Tx Frequency Range	: 824.2 MHz ~ 848.8 MHz (GSM850) 1850.2 MHz ~ 1909.8 MHz (PCS1900) 826.4 MHz ~ 846.6 MHz (WCDMA V) 1852.4 MHz ~ 1907.6 MHz (WCDMA II)
Conducted Max Power	: 31.60 dBm(GPRS850), 28.30 dBm(GPRS1900), 22.20 dBm(WCDMA V), 21.46 dBm(WCDMA II)
Battery Type	: USB Power Supply from Laptop Computer

1.5 Test Environment

Ambient temperature	: (22 ± 2) ° C
Tissue Simulating Liquid	: (22 ± 2) ° C
Relative Humidity	: (55 ± 5) % R.H.

1.6 Operation Configuration

The device in GSM and WCDMA mode was controlled by using a Communication tester (CMU 200). Communication between the device and the tester was established by air link. Measurements were performed at the lowest, middle and highest channels of the operating band. The power of EUT was supplied by USB port of Host PC and it was tested with the extender cable that was given by manufacturer as the accessory. Please refer to the below information of Host PC and find the setup photo file.

The DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement.

Host PC Information

Position	Manufacturer	Model Name
Horizontal Up	Sony Corporation	PCG-1P6P
Vertical Front	Lenovo	T60

1.7 EVALUATION PROCEDURES

- Power Reference Measurement Procedures

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 4 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (for example, 2.7 mm for an ET3DV6 probe type).

- The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

The probe is calibrated at the center of the dipole sensors that is located 1 mm to 2.7 mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1 % for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with

relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1 g and 10 g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30 g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1 g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.8 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ET3DV6 1782 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant. The DASY4 system for performing compliance tests consists of the following items:

•A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

•A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

•A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

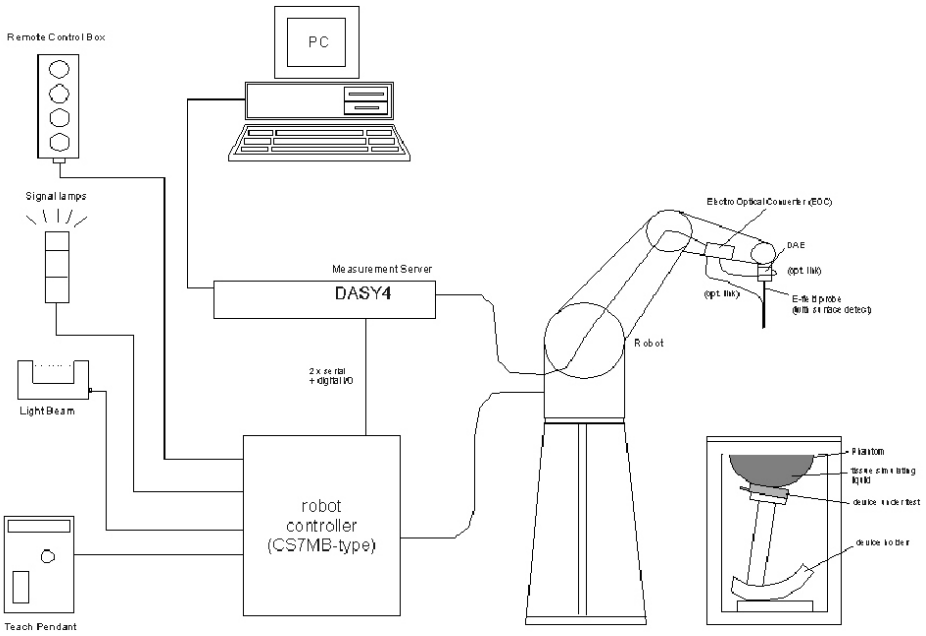


Fig a. The microwave circuit arrangement used for SAR system verification

• The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.

• The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

• A probe alignment unit which improves the (absolute) accuracy of the probe positioning.

• A computer operating Windows 2000 or Windows XP.

• DASY4 software.

• Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.

• The SAM twin phantom enabling testing body usage.

• The device holder for flat phantom.

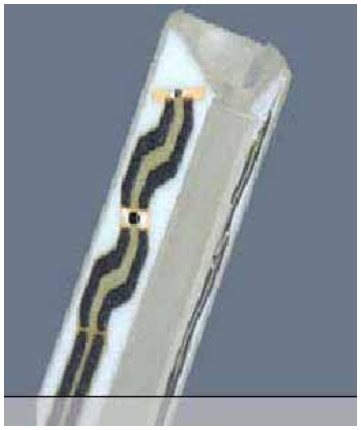
• Tissue simulating liquid mixed according to the given recipes.

• Validation dipole kits allowing to validate the proper functioning of the system.

1.9 System Components

ET3DV6 E-Field Probe

Construction	:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol).
Calibration	:	In air from 10 MHz to 2.5 GHz In brain simulating tissue (accuracy ± 8 %)
Frequency	:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity	:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range	:	5 µW/g to >100 mW/g; Linearity: ±0.2 dB
Srfce. Detect	:	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	:	General dosimetry up to 3 GHz Compliance tests of mobile phone



ET3DV6 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX D” for the Calibration Certification Report.

SAM Phantom

Construction: The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot

Shell Thickness: 2.0 mm ± 0.1 mm

Filling Volume: Approx. 25 liters

SAM Phantom

DEVICE HOLDER

Construction In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

1.10 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10 % from the target SAR values. These tests were done at 835 MHz, 1900 MHz. The tests for EUT were conducted within 24 hours after each validation. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ° C, the relative humidity was in the range (55 ± 5) % R.H. and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

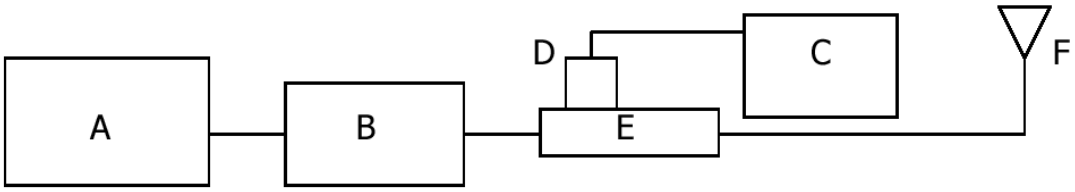


Fig b. The microwave circuit arrangement used for SAR system verification

A. Agilent Model E4421B Signal Generator
B. EMPOWER Model 2057-BBS3Q5KCK Amplifier
C. Agilent Model E4419B Power Meter
D. Agilent Model 9300H Power Sensor
E. Agilent Model 777D/778D Dual directional coupling
F. Reference dipole Antenna

Photo of the dipole Antenna

System Validation Results

Validation Kit	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D835V2 S/N: 490	835 MHz Body	9.84 W/kg	**9.72 W/kg**	**-1.22**	2011-03-29	22.0
D1900V2 S/N: 5d033	1900 MHz Body	41.3 W/kg	**39.28W/kg**	**-4.89**	2011-03-28	22.1

Table 1. Results system validation

1.11 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequence band 200 MHz to 20 GHz) in conjunction with Agilent E5070B Network Analyzer(300 KHz - 3 GHz) by using a procedure detailed in Section V.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
835	Body	Measured, 2011-03-29	**55.7**	**0.95**	22.0
		Recommended Limits	55.2	0.97	21.0 ~ 23.0
		Deviation(%)	0.91	-2.06	-
1900	Body	Measured, 2011-03-28	**51.6**	**1.56**	22.1
		Recommended Limits	53.3	1.52	21.0 ~ 23.0
		Deviation(%)	-3.19	2.63	-

The composition of the brain tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	**Frequency (MHz)**									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99 $^{+}$% Pure Sodium Chloride Sugar: 98 $^{+}$% Pure Sucrose

Water: De-ionized, 16 MΩ^{+} resistivity HEC: Hydroxyethyl Cellulose

DGBE: 99 $^{+}$% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

1.12 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,’’ ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

Human Exposure	**Uncontrolled Environment General Population**	**Controlled Environment Occupational**
Partial Peak SAR (Partial)	1.60 m W/g	8.00 m W/g
Partial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

Table .4 RF exposure limits

2. Instruments List

Maunfacturer	Device	Type	Serial Number	Due date of Calibration
Stäubli	Robot	RX90BL	F03/5W05A1/A/01	N/A
Schmid& Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1782	April 28, 2011
Schmid& Partner Engineering AG	835 MHz System Validation Dipole	D835V2	490	May 21, 2012
Schmid& Partner Engineering AG	1900 MHz System Validation Dipole	D1900V2	5d033	May 26, 2012
Schmid& Partner Engineering AG	Data acquisition Electronics	DAE3	567	January 27, 2012
Schmid& Partner Engineering AG	Software	DASY 4 V4.7	-	N/A
Schmid& Partner Engineering AG	Phantom	SAM Phantom V4.0	TP-1299 TP-1300	N/A
Agilent	Network Analyzer	E5070B	MY42100282	March 31, 2012
Agilent	Dielectric Probe Kit	85070D	2184	N/A
Agilent	Power Meter	E4419B	GB43311126	September 28, 2011
Agilent	Power Sensor	E9300H	MY41495307	October 01, 2011
			MY41495308	October 01, 2011
Agilent	Signal Generator	E4421B	MY43350132	September 28, 2011
Empower RF Systems	Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	April 01, 2012
Agilent	Dual Directional Coupler	777D 778D	50128 50454	September 28, 2011
Microlab	LP Filter	LA-15N LA-30N	N/A	October 01, 2011
R&S	Mobile Test Unit	CMU 200	109495	September 29, 2011

3.Summary of Results

FCC Power Measurement Procedures

Power measurements were performed using a base station simulator under digital average power.

The Dongle was placed into a simulated call using a base station simulator in shielded chamber. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

RF Conducted Power

	Channel	Frequency(MHz)	Conducted Power(dBm)			
			GPRS			
			1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM 850 Band	128	824.2	32.20	28.80	27.10	25.80
	190	836.6	32.20	28.80	27.10	25.70
	251	848.8	32.00	28.60	26.80	25.50
PCS 1900 Band	512	1850.2	28.80	25.80	24.00	22.80
	661	1880.0	28.80	25.80	24.00	22.80
	810	1909.8	28.80	25.90	24.10	22.90

	Channel	Frequency(MHz)	Conducted Power(dBm)			
			EDGE			
			1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM 850 Band	128	824.2	28.60	25.80	24.10	22.30
	190	836.6	28.20	25.70	23.50	22.20
	251	848.8	28.20	25.40	23.30	21.90
PCS 1900 Band	512	1850.2	26.90	24.10	22.10	20.50
	661	1880.0	26.80	23.90	21.90	20.80
	810	1909.8	26.90	23.70	21.60	20.50

WCDMA V

Band	Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	β c	β d
WCDMA V (RMC)	RMC	4132	826.4	22.20	-	-
	RMC	4183	836.6	22.13		
	RMC	4233	846.6	21.97		
WCDMA V (HSDPA Active)	Sub-test 1	4132	826.4	21.97	2	15
		4183	836.6	21.99		
		4233	846.6	22.09		
	Sub-test 2	4132	826.4	22.11	12	15
		4183	836.6	22.02		
		4233	846.6	21.84		
	Sub-test 3	4132	826.4	21.51	15	8
		4183	836.6	21.51		
		4233	846.6	21.60		
	Sub-test 4	4132	826.4	21.56	15	4
		4183	836.6	21.55		
		4233	846.6	21.66		
WCDMA V (HSUPA)	Sub-test 1	4132	826.4	22.14	11	15
		4183	836.6	22.06		
		4233	846.6	21.89		
	Sub-test 2	4132	826.4	20.20	6	15
		4183	836.6	20.14		
		4233	846.6	19.93		
	Sub-test 3	4132	826.4	21.18	15	15
		4183	836.6	21.12		
		4233	846.6	20.97		
	Sub-test 4	4132	826.4	20.25	2	15
		4183	836.6	20.20		
		4233	846.6	20.01		
	Sub-test 5	4132	826.4	22.00	15	15
		4183	836.6	21.89		
		4233	846.6	21.78		

WCDMA II

Band	Mode	Channel	Frequency (MHz)	Conducted Power (dBm)	β c	β d
WCDMA II (RMC)	RMC	9262	1852.4	21.29	-	-
	RMC	9400	1880.0	21.06		
	RMC	9538	1907.6	21.08		
WCDMA II (HSDPA Active)	Sub-test 1	9262	1852.4	21.46	2	15
		9400	1880.0	20.95		
		9538	1907.6	20.94		
	Sub-test 2	9262	1852.4	21.17	12	15
		9400	1880.0	20.92		
		9538	1907.6	20.93		
	Sub-test 3	9262	1852.4	20.98	15	8
		9400	1880.0	20.50		
		9538	1907.6	20.41		
	Sub-test 4	9262	1852.4	21.05	15	4
		9400	1880.0	20.51		
		9538	1907.6	20.53		
WCDMA II (HSUPA)	Sub-test 1	9262	1852.4	21.21	11	15
		9400	1880.0	21.04		
		9538	1907.6	21.02		
	Sub-test 2	9262	1852.4	19.26	6	15
		9400	1880.0	19.11		
		9538	1907.6	19.06		
	Sub-test 3	9262	1852.4	20.27	15	15
		9400	1880.0	20.06		
		9538	1907.6	20.10		
	Sub-test 4	9262	1852.4	19.39	2	15
		9400	1880.0	19.16		
		9538	1907.6	19.10		
	Sub-test 5	9262	1852.4	21.10	15	15
		9400	1880.0	20.90		
		9538	1907.6	20.93		

KDB 447498 D02 SAR Procedures for Dongle Xmtr v02 _Nov. 2009

The procedures are intended for USB dongle transmitters with internal antennas, which are referred to as “simple dongles”.

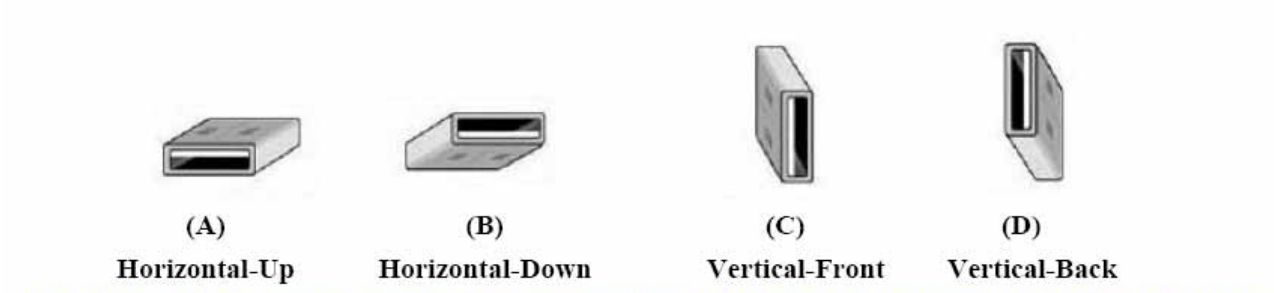
<Simple Dongle Procedures>

Test all USB orientations [see figure below] with a device-to-phantom separation distance of 5mm or less, according to KDB 447498 requirements. These test orientations are intended for the exposure conditions found in typical laptop/notebook/netbook or tablet computers with either horizontal or vertical USB connector configurations at various locations in the keyboard section of the computer. Current generation portable host computers should be used to establish the required SAR measurement separation distance. The same test separation distance must be used to test all frequency bands and modes in each USB orientation. The typical Horizontal-Up USB connection (A), found in the majority of host computers, must be tested using an appropriate host computer. A host computer with either Vertical-Front (C) or Vertical-Back (D) USB connection should be used to test one of the vertical USB orientations. If a suitable host computer is not available for testing the Horizontal-Down (B) or the remaining vertical USB orientation, a high quality USB cable, 12 inches or less, may be used for testing these other orientations. It must be documented that the USB cable does not influence the radiating characteristics and output power of the transmitter.

<Other SAR Test Considerations>

Dongles with certain spacers, contours or tapering added to the housing should generally be tested according to the 5 mm test separation requirement required for simple dongles, which is based on overall host platform, device and user operating configurations and exposure conditions of a peripheral device as compared to individual use conditions.

USB dongle transmitters must show compliance at a test separation distance of 5 mm. When the SAR is ≥ 1.2 W/kg, applications for equipment certification require a PBA for TCB approval. When the SAR is ≥ 1.2 W/kg, especially for SAR > 1.5 W/kg, certain caution statements, labels and other means to ensure compliance may be required.



Note: These are USB connector orientations on laptop computers; USB dongles have the reverse configuration for plugging into the corresponding laptop computers.

USB Connector Orientations Implemented on Laptop Computers

<Figure>

Ambient Temperature (°C)	22.0
Liquid Temperature (°C)	22.0
Date	2011-03-29

GSM850 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
GPRS	Horizontal Up	1 Tx	836.6	190	-0.158	0.486	1.6
	Horizontal Up	2 Tx	836.6	190	0.008	**0.509**	
	Horizontal Up	3 Tx	836.6	190	-0.152	0.460	
	Horizontal Up	4 Tx	836.6	190	0.019	0.451	
	Horizontal Down	2 Tx	836.6	190	-0.173	0.492	
	Vertical Front	2 Tx	836.6	190	-0.003	0.471	
	Vertical Back	2 Tx	836.6	190	-0.133	0.452	
	Top	2 Tx	836.6	190	0.003	0.098	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
4. The distance from EUT to flat phantom for testing Body SAR is 5 mm.
5. This model supports GPRS (Class 12) and EDGE. The power in GPRS mode is higher than in EDGE mode and all EUT positions were tested with 2 Tx slot up, and than all Tx (1Tx ~ 4Tx) cases were tested at the worst result position.

Ambient Temperature (°C)	22.1
Liquid Temperature (°C)	22.1
Date	2011-03-28

PCS1900 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
GPRS	Horizontal Up	1 Tx	1850.2	512	-0.108	0.724	1.6
	Horizontal Up	1 Tx	1880.0	661	-0.159	**0.921**	
	Horizontal Up	1 Tx	1909.8	810	-0.027	0.890	
	Horizontal Up	2 Tx	1880.0	661	-0.080	0.680	
	Horizontal Up	3 Tx	1880.0	661	-0.148	0.749	
	Horizontal Up	4 Tx	1880.0	661	-0.035	0.738	
	Horizontal Down	2 Tx	1880.0	661	-0.055	0.610	
	Vertical Front	2 Tx	1880.0	661	-0.051	0.502	
	Vertical Back	2 Tx	1880.0	661	-0.070	0.285	
	Top	2 Tx	1880.0	661	-0.096	0.141	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
4. The distance from EUT to flat phantom for testing Body SAR is 5 mm.
5. This model supports GPRS (Class 12) and EDGE. The power in GPRS mode is higher than in EDGE mode and all EUT positions were tested with 2 Tx slot up, and than all Tx (1Tx ~ 4Tx) cases were tested at the worst result position.

Ambient Temperature (°C)	22.0
Liquid Temperature (°C)	22.0
Date	2011-03-29

WCDMA V Body SAR

Band	EUT Position	Mode	Traffic Channel		Power Drift (dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
WCDMA V	Horizontal Up	RMC	836.6	4183	-0.117	**0.451**	1.6
	Horizontal Down	RMC	836.6	4183	-0.031	0.385	
	Vertical Front	RMC	836.6	4183	-0.127	0.316	
	Vertical Back	RMC	836.6	4183	-0.009	0.392	
	Top	RMC	836.6	4183	-0.149	0.124	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
4. The distance from EUT to flat phantom for testing Body SAR is 5 mm.
5. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive.

Ambient Temperature (°C)	22.1
Liquid Temperature (°C)	22.1
Date	2011-03-28

WCDMA II Body SAR

Band	EUT Position	Mode	Traffic Channel		Power Drift (dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
WCDMA II	Horizontal Up	RMC	1852.4	9262	-0.057	0.808	1.6
	Horizontal Up	RMC	1880.0	9400	-0.108	**1.29**	
	Horizontal Up	RMC	1907.6	9538	-0.086	1.28	
	Horizontal Down	RMC	1880.0	9400	-0.006	0.766	
	Vertical Front	RMC	1880.0	9400	-0.138	0.448	
	Vertical Back	RMC	1880.0	9400	-0.070	0.486	
	Top	RMC	1880.0	9400	0.028	0.189	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
4. The distance from EUT to flat phantom for testing Body SAR is 5 mm.
5. WCDMA mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive.

Appendix

List

Appendix A	DASY4 Report (Plots of the SAR Measurements)	- 835 MHz Validation Test - 1900 MHz Validation Test - GSM850 Test - PCS1900 Test - WCMDA V Test - WCDMA II Test
Appendix B	Uncertainty Analysis	
Appendix C	Calibration Certificate	- PROBE - DAE - DIPOLE

Appendix A

Test Plot - DASY4 Report

835 MHz Validation Test

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: Validation 835 MHz_Body.da4

Input power : 250 mW

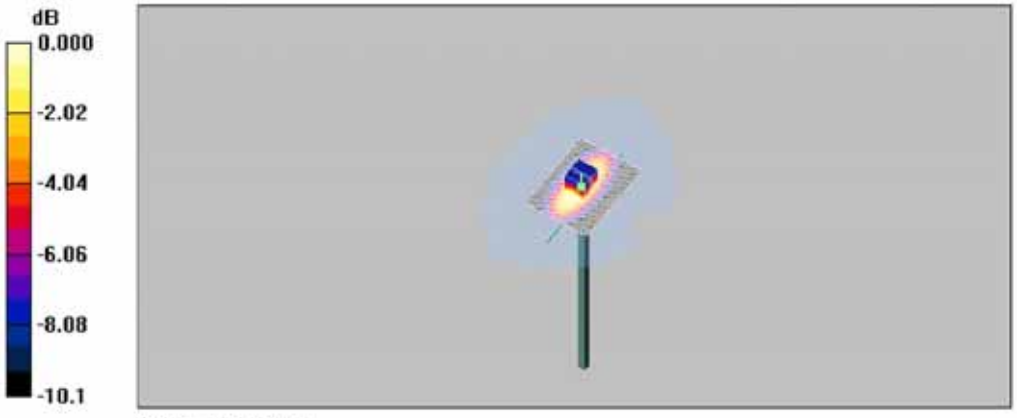
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Validation 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.946 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

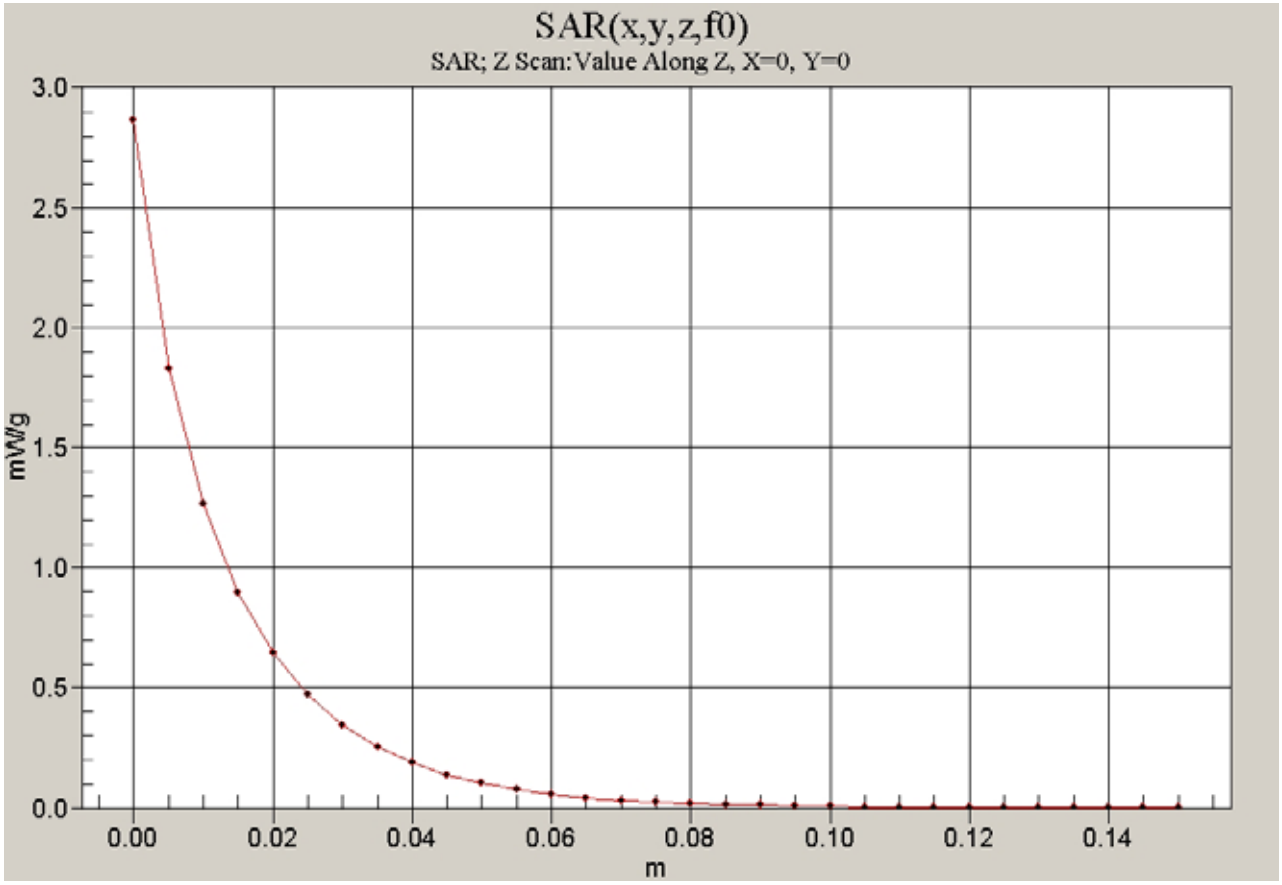
Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.62 mW/g

Validation 835 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.0 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.61 mW/g
Maximum value of SAR (measured) = 2.64 mW/g



0 dB = 2.64mW/g

Z Scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

1900 MHz Validation Test

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: Validation 1900 MHz_Body.da4

Input power : 250 mW

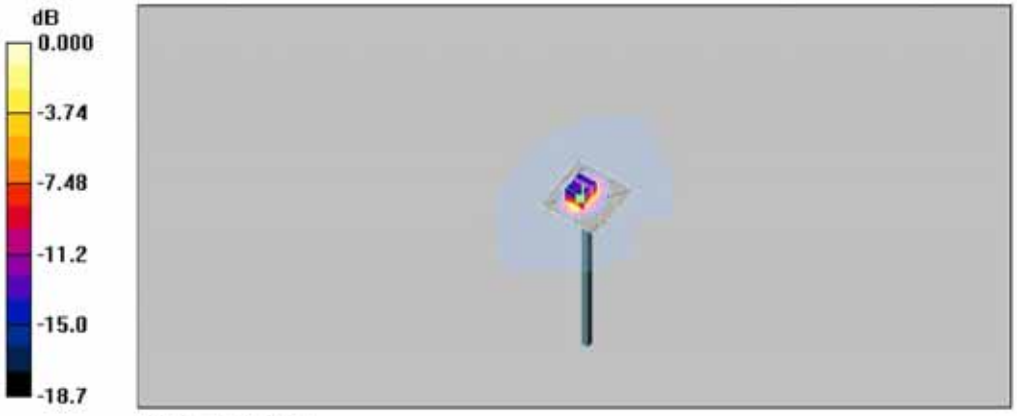
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz_Body

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

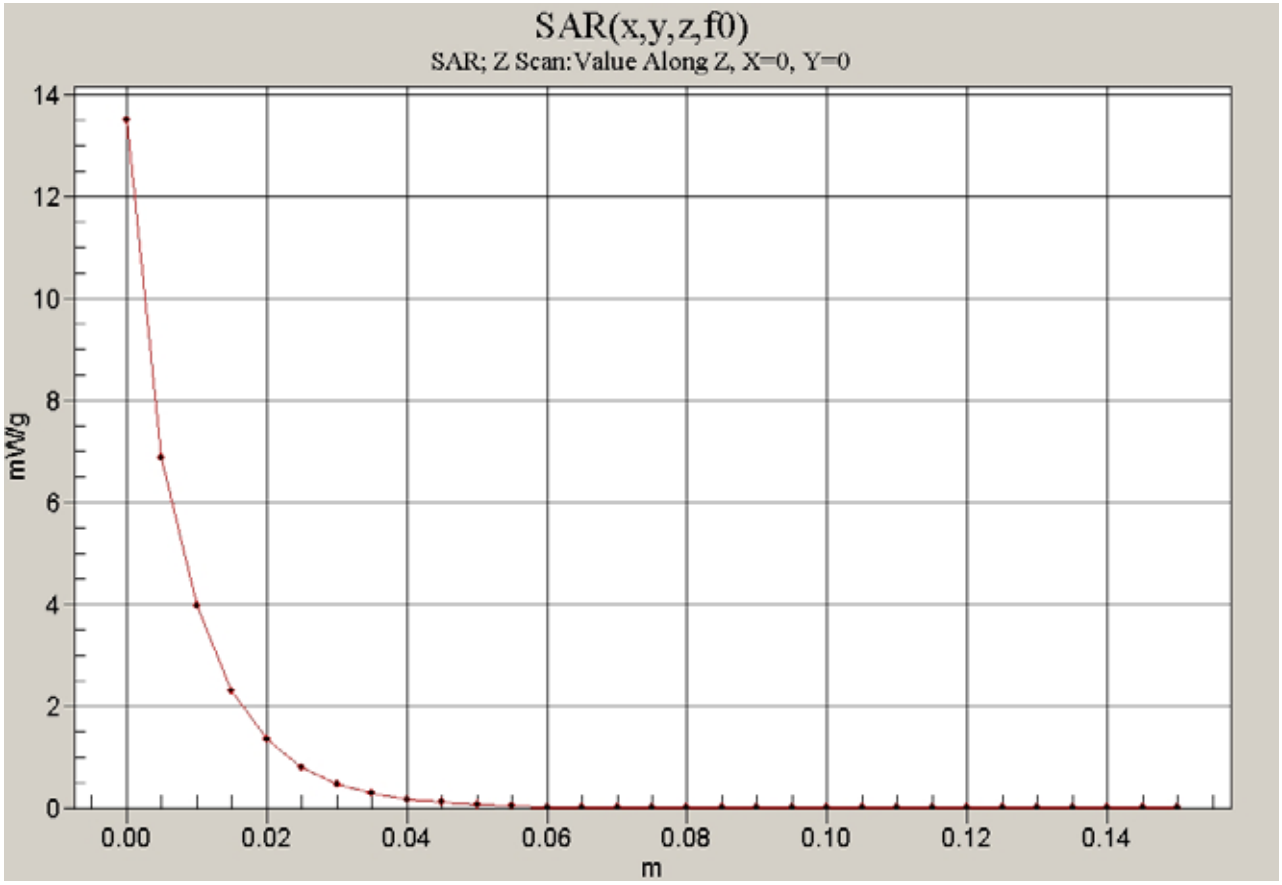
Validation 1900 MHz_Body/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.2 mW/g

Validation 1900 MHz_Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 83.2 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 15.7 W/kg
SAR(1 g) = 9.82 mW/g; SAR(10 g) = 5.17 mW/g
Maximum value of SAR (measured) = 11.3 mW/g



0 dB = 11.3mW/g

Z Scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
14
12
10
8
6
4
2
0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

GSM 850 SAR Test

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Horizontal Up_1Tx.da4

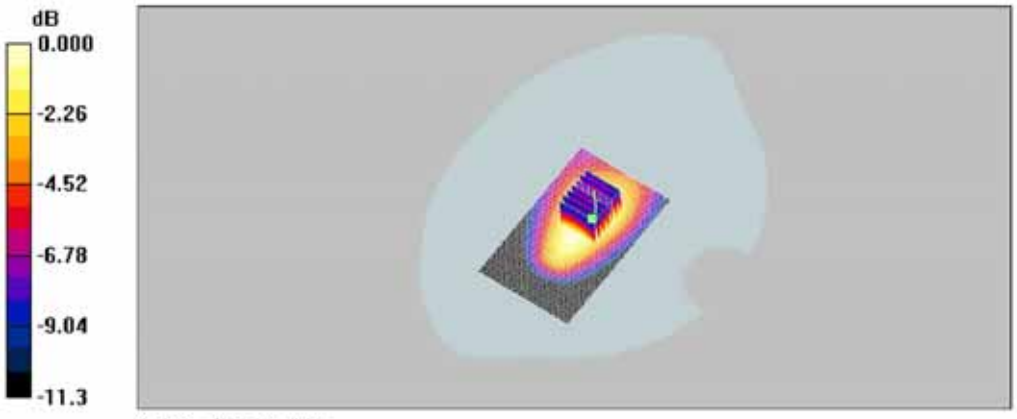
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Horizontal Up_Mid_1Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.592 mW/g

GPRS850_Horizontal Up_Mid_1Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = -0.158 dB
Peak SAR (extrapolated) = 0.697 W/kg
SAR(1 g) = 0.486 mW/g; SAR(10 g) = 0.322 mW/g
Maximum value of SAR (measured) = 0.515 mW/g



0 dB = 0.515mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Horizontal Up_2Tx.da4

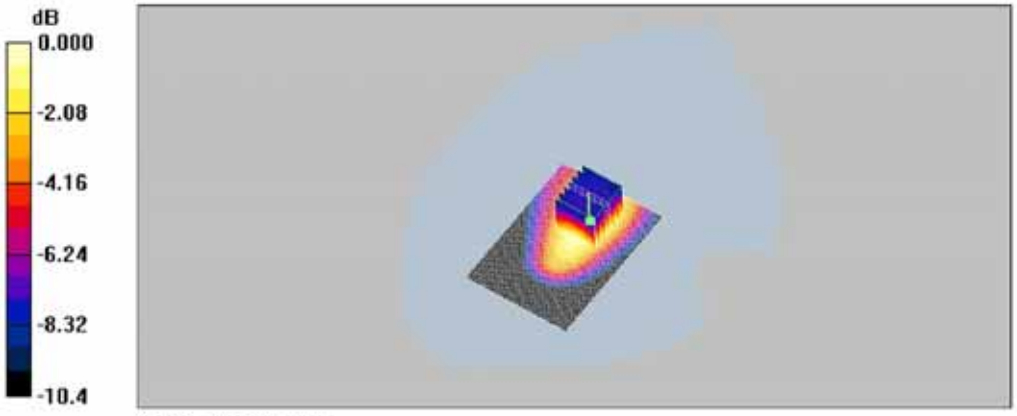
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

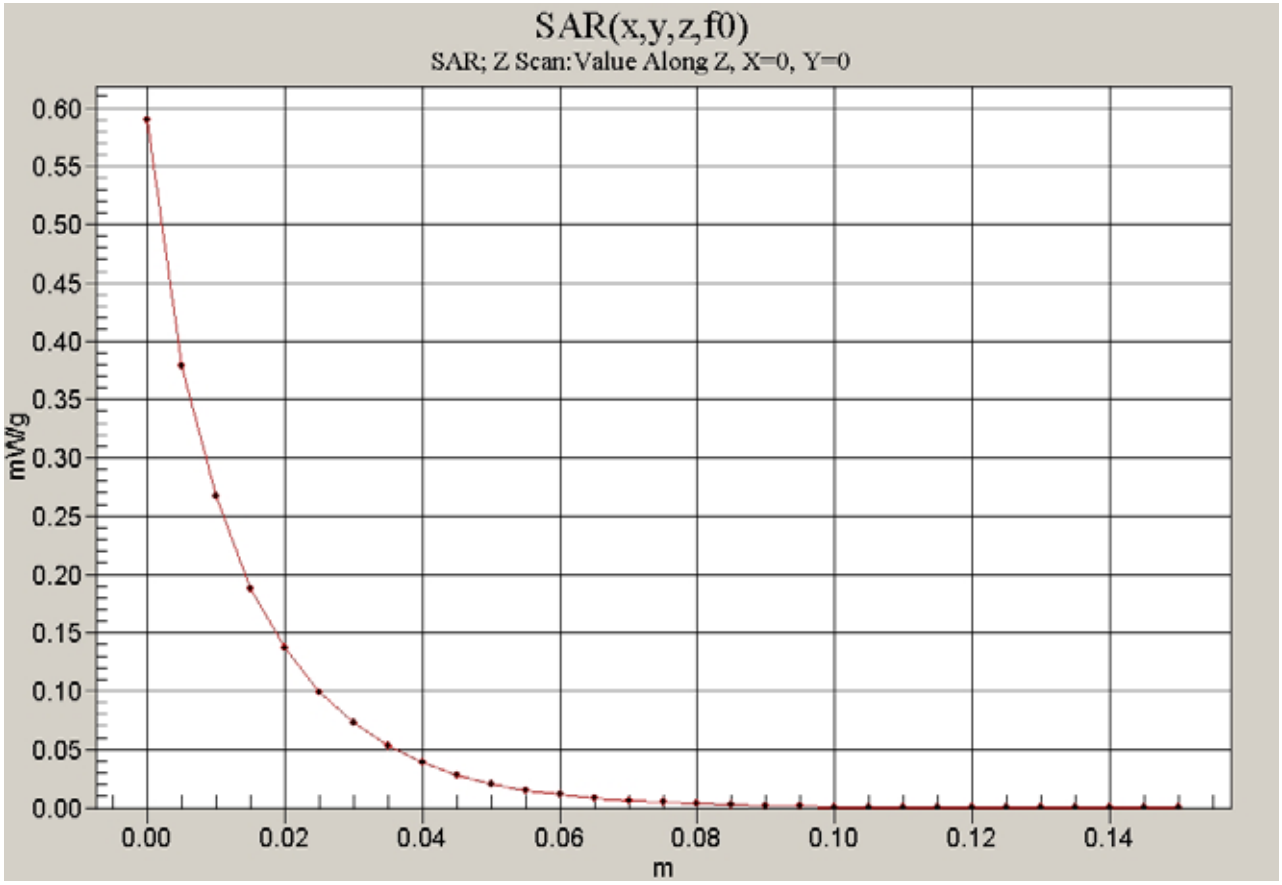
GPRS850_Horizontal Up_Mid_2Tx/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.563 mW/g

GPRS850_Horizontal Up_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 0.730 W/kg
SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.337 mW/g
Maximum value of SAR (measured) = 0.550 mW/g



0 dB = 0.550mW/g

Z Scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Horizontal Up_3Tx.da4

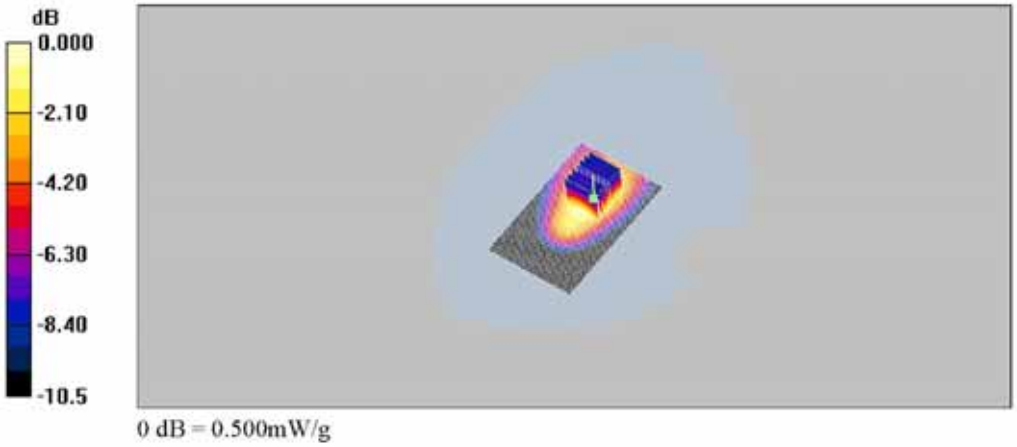
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:2.67
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Horizontal Up_Mid_3Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.506 mW/g

GPRS850_Horizontal Up_Mid_3Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.9 V/m; Power Drift = -0.152 dB
Peak SAR (extrapolated) = 0.657 W/kg
SAR(1 g) = 0.460 mW/g; SAR(10 g) = 0.306 mW/g
Maximum value of SAR (measured) = 0.500 mW/g



0 dB = 0.500mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Horizontal Up_4Tx.da4

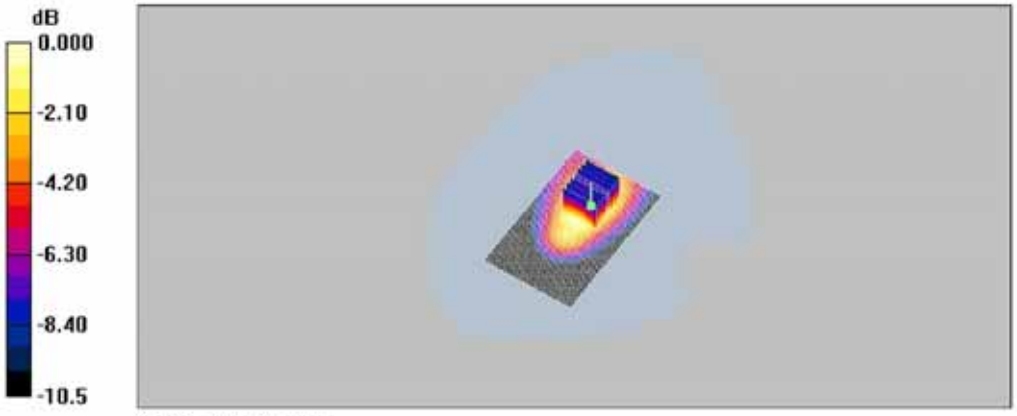
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:2
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Horizontal Up_Mid_4Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.495 mW/g

GPRS850_Horizontal Up_Mid_4Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.2 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.641 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.489 mW/g



0 dB = 0.489mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Horizontal Down_2Tx.da4

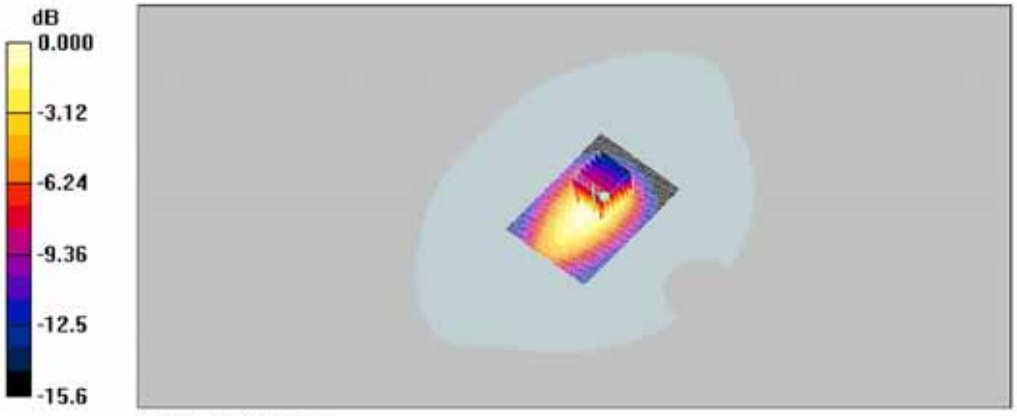
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Horizontal Down_Mid_2Tx/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.559 mW/g

GPRS850_Horizontal Down_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.8 V/m; Power Drift = -0.173 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.537 mW/g



0 dB = 0.537mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Vertical Front_2Tx.da4

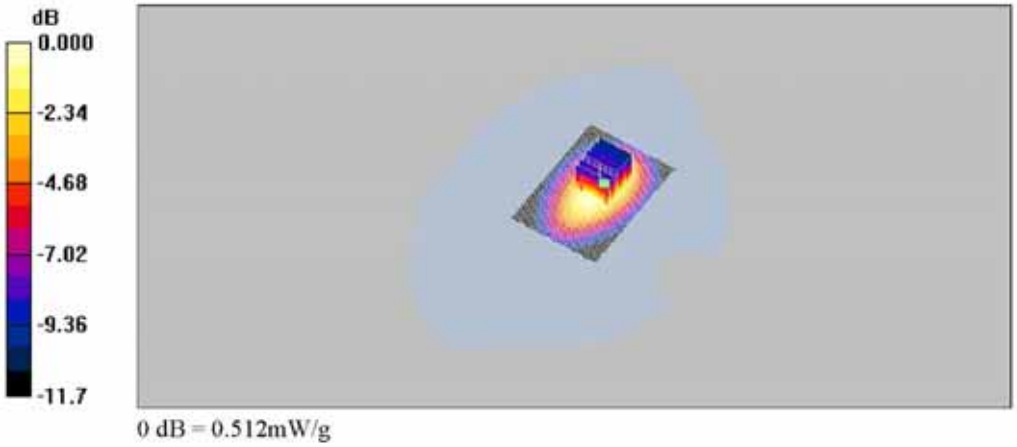
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Vertical Front_Mid_2Tx/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.517 mW/g

GPRS850_Vertical Front_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.4 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 0.685 W/kg
SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.306 mW/g
Maximum value of SAR (measured) = 0.512 mW/g



0 dB = 0.512mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Vertical Back_2Tx.da4

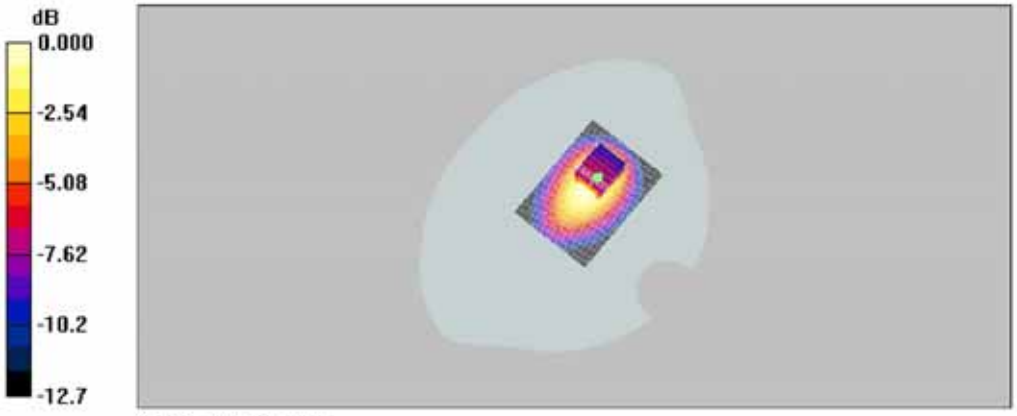
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Vertical Back_Mid_2Tx/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.515 mW/g

GPRS850_Vertical Back_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.133 dB
Peak SAR (extrapolated) = 0.685 W/kg
SAR(1 g) = 0.452 mW/g; SAR(10 g) = 0.291 mW/g
Maximum value of SAR (measured) = 0.486 mW/g



0 dB = 0.486mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: GPRS850_Top_2Tx.da4

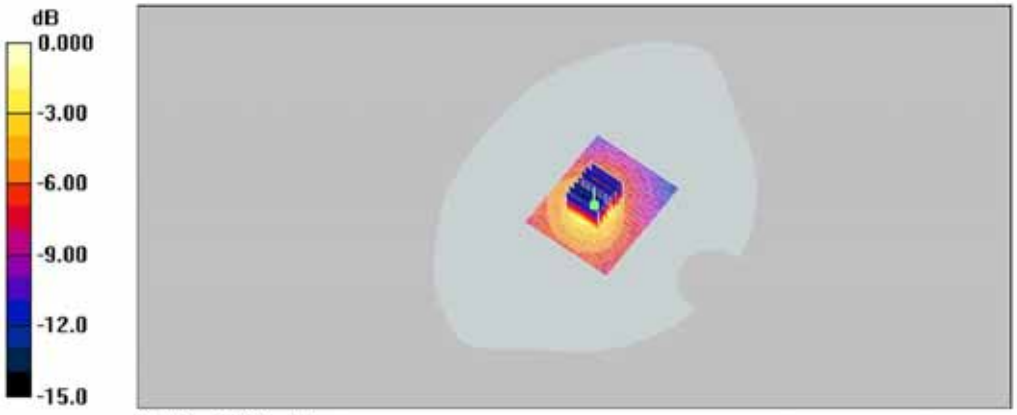
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS850_Body

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850_Top_Mid_2Tx/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.093 mW/g

GPRS850_Top_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.100 mW/g



0 dB = 0.100mW/g

PCS 1900 SAR Test

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_1Tx.da4

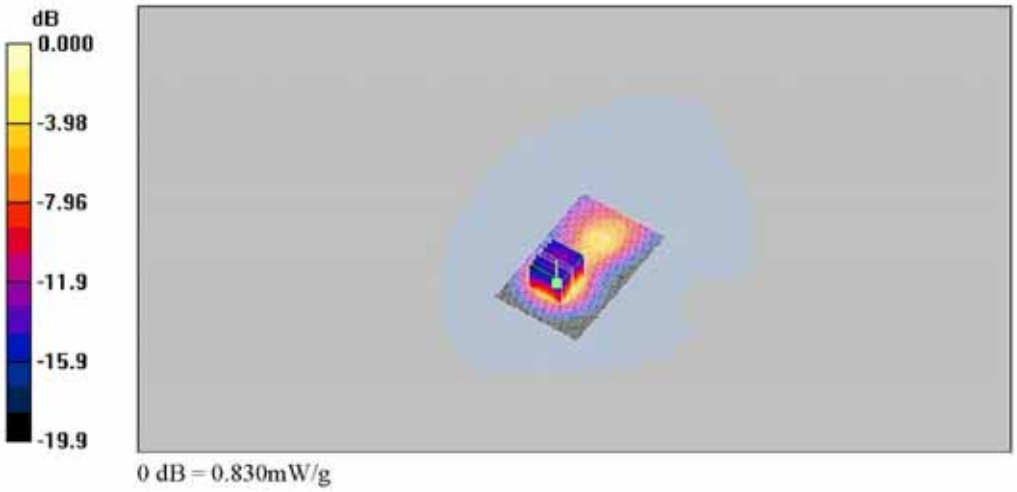
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.51 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Up_Low_1Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.944 mW/g

GPRS1900_Horizontal Up_Low_1Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.724 mW/g; SAR(10 g) = 0.360 mW/g
Maximum value of SAR (measured) = 0.830 mW/g



0 dB = 0.830mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_1Tx.da4

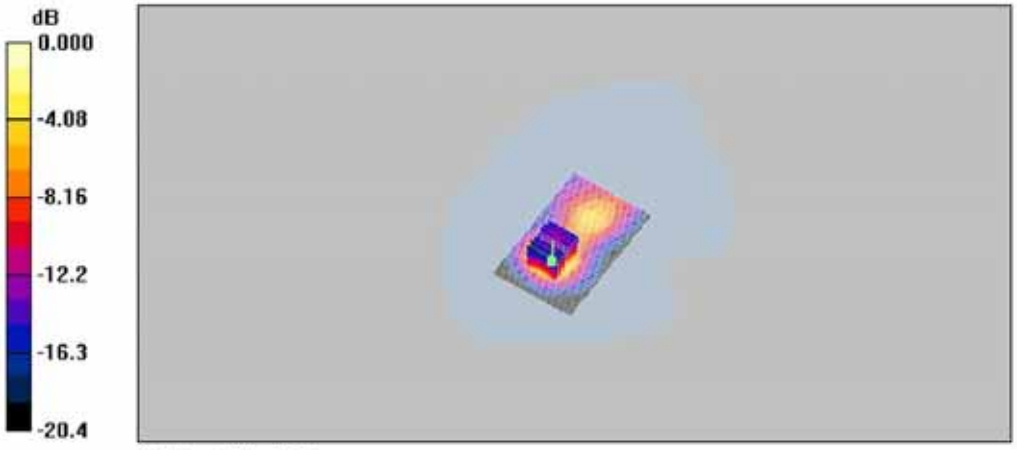
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

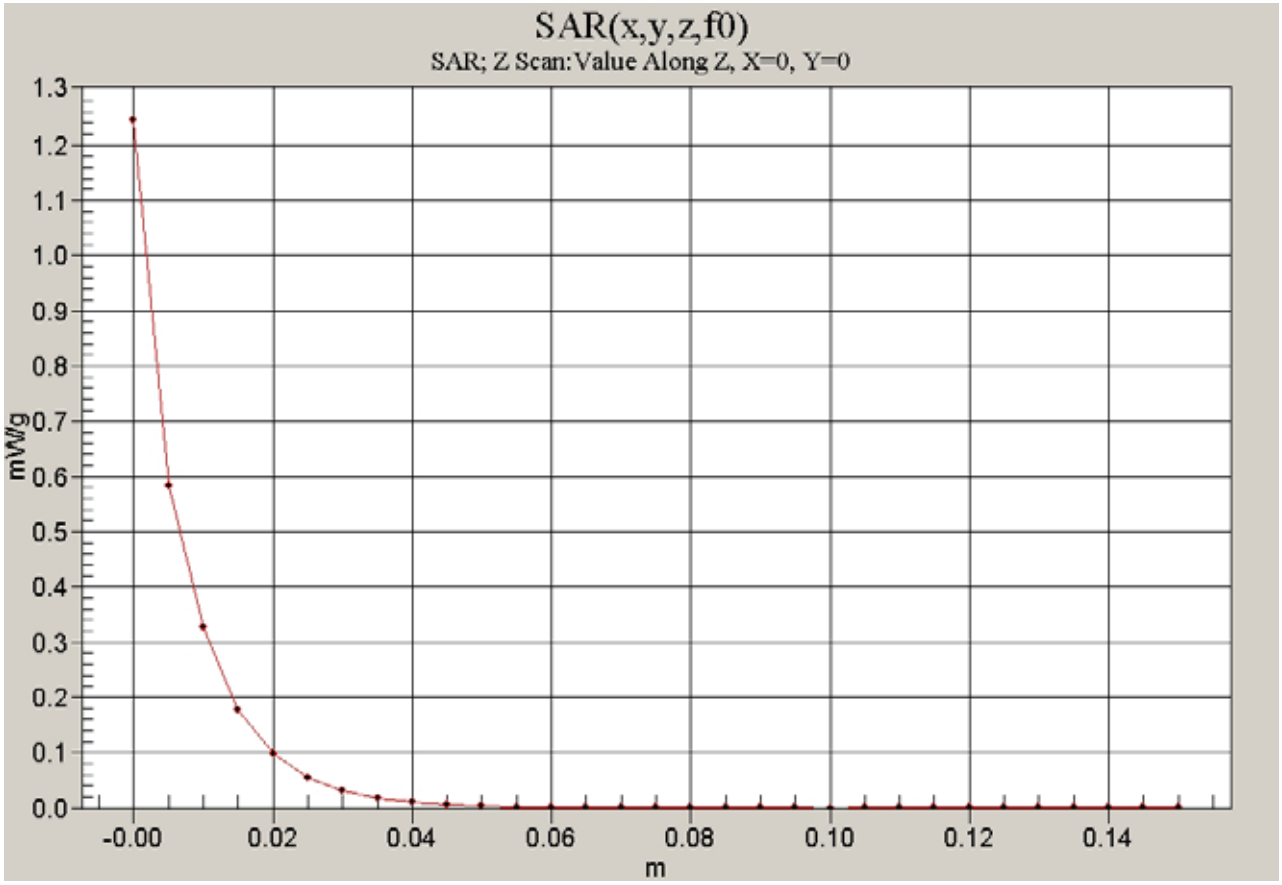
GPRS1900_Horizontal Up_Mid_1Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.24 mW/g

GPRS1900_Horizontal Up_Mid_1Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.921 mW/g; SAR(10 g) = 0.456 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 1.04mW/g

Z Scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_1Tx.da4

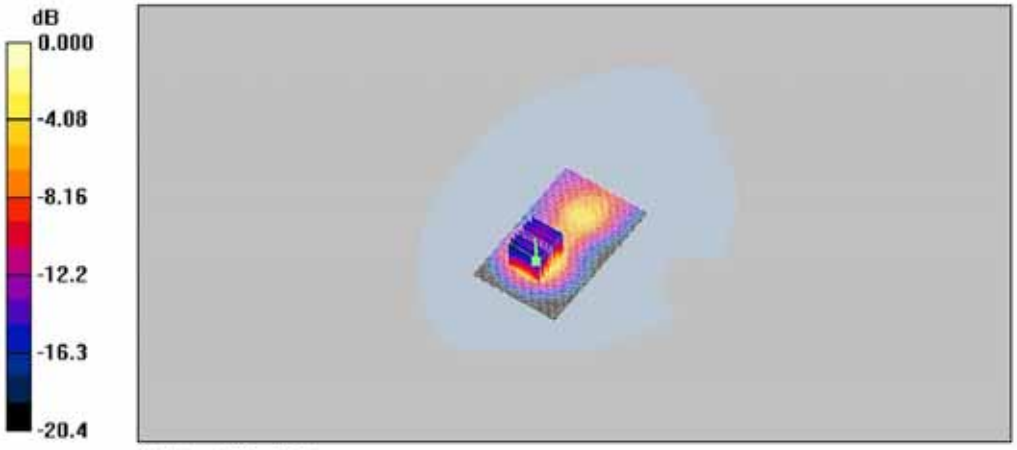
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1910 MHz; σ = 1.57 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Up_High_1Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 mW/g

GPRS1900_Horizontal Up_High_1Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.7 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 0.890 mW/g; SAR(10 g) = 0.438 mW/g
Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_2Tx.da4

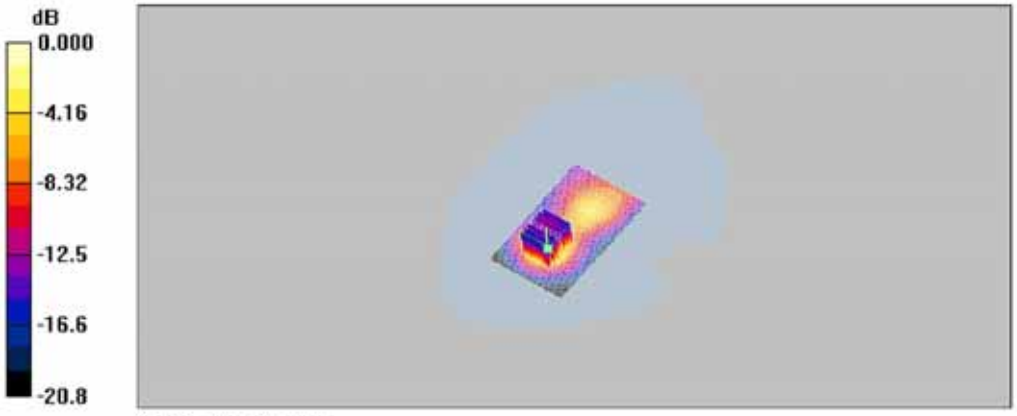
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Up_Mid_2Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.947 mW/g

GPRS1900_Horizontal Up_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.080 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.680 mW/g; SAR(10 g) = 0.353 mW/g
Maximum value of SAR (measured) = 0.749 mW/g



0 dB = 0.749mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_3Tx.da4

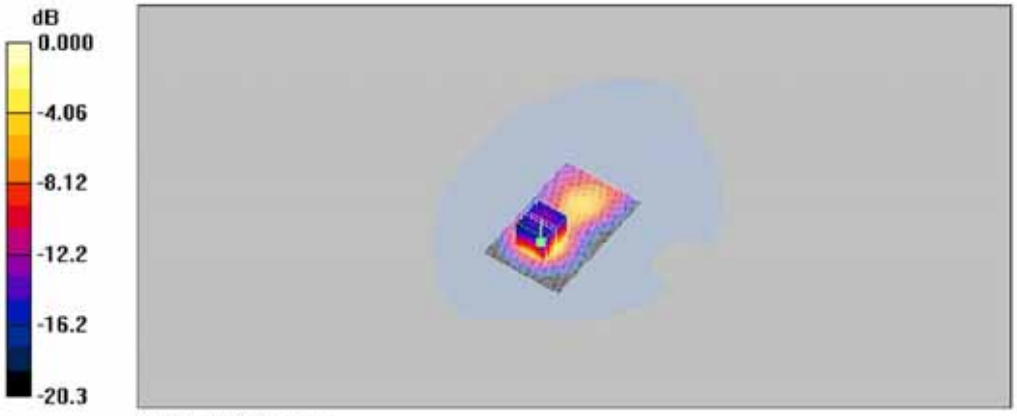
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.67
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Up_Mid_3Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.933 mW/g

GPRS1900_Horizontal Up_Mid_3Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.373 mW/g
Maximum value of SAR (measured) = 0.857 mW/g



0 dB = 0.857mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Up_4Tx.da4

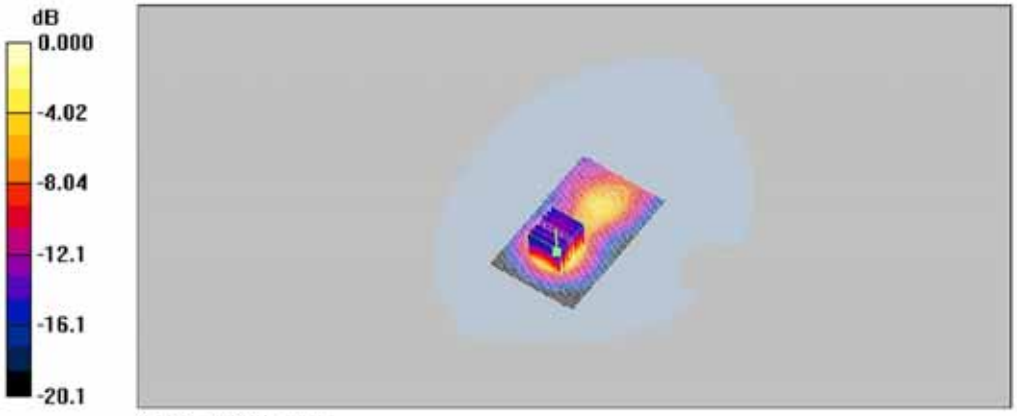
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Up_Mid_4Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.998 mW/g

GPRS1900_Horizontal Up_Mid_4Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.738 mW/g; SAR(10 g) = 0.371 mW/g
Maximum value of SAR (measured) = 0.838 mW/g



0 dB = 0.838mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Horizontal Down_2Tx.da4

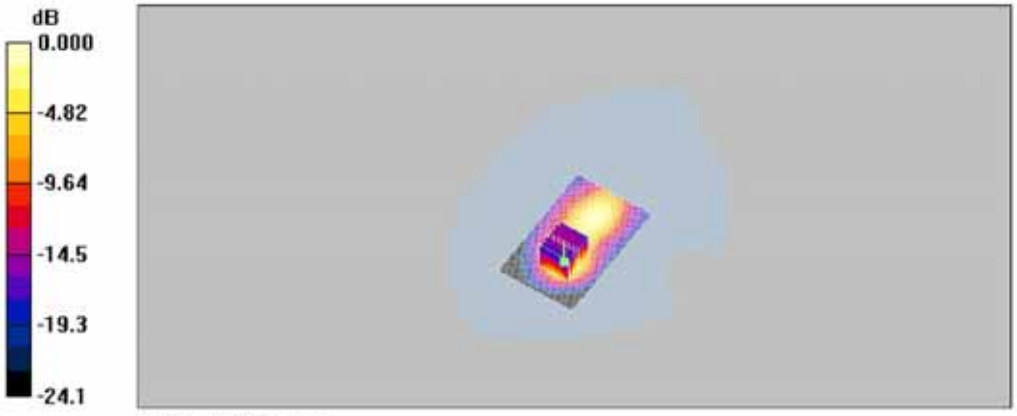
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Horizontal Down_Mid_2Tx/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.808 mW/g

GPRS1900_Horizontal Down_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.6 V/m; Power Drift = -0.055 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.610 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 0.696 mW/g



0 dB = 0.696mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Vertical Front_2Tx.da4

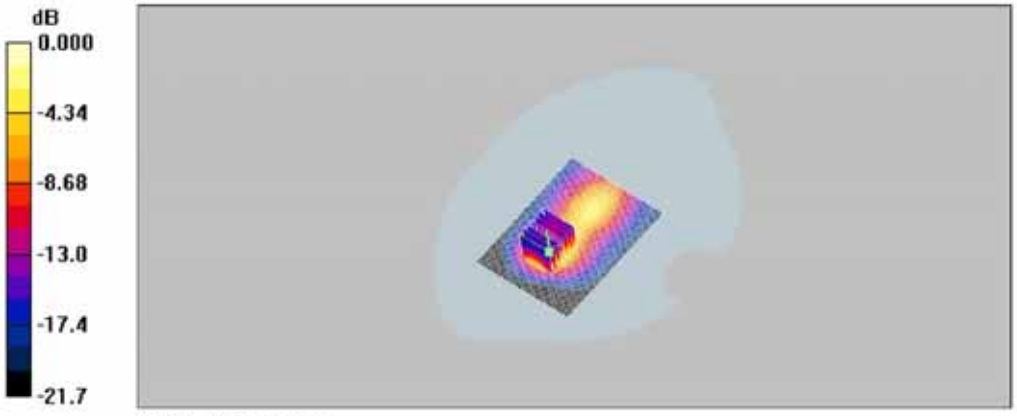
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Vertical Front_Mid_2Tx/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.607 mW/g

GPRS1900_Vertical Front_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 0.909 W/kg
SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.243 mW/g
Maximum value of SAR (measured) = 0.578 mW/g



0 dB = 0.578mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Vertical Back_2Tx.da4

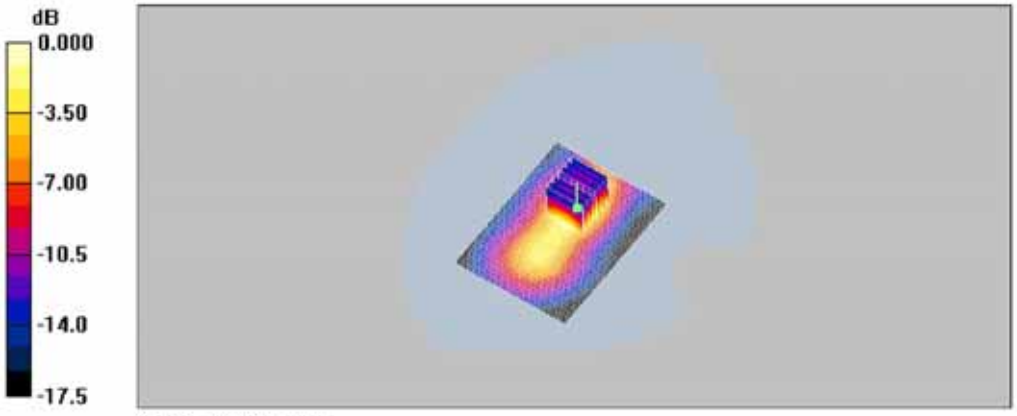
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Vertical Back_Mid_2Tx/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.337 mW/g

GPRS1900_Vertical Back_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.3 V/m; Power Drift = -0.070 dB
Peak SAR (extrapolated) = 0.470 W/kg
SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.157 mW/g
Maximum value of SAR (measured) = 0.321 mW/g



0 dB = 0.321mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: GPRS1900_Top_2Tx.da4

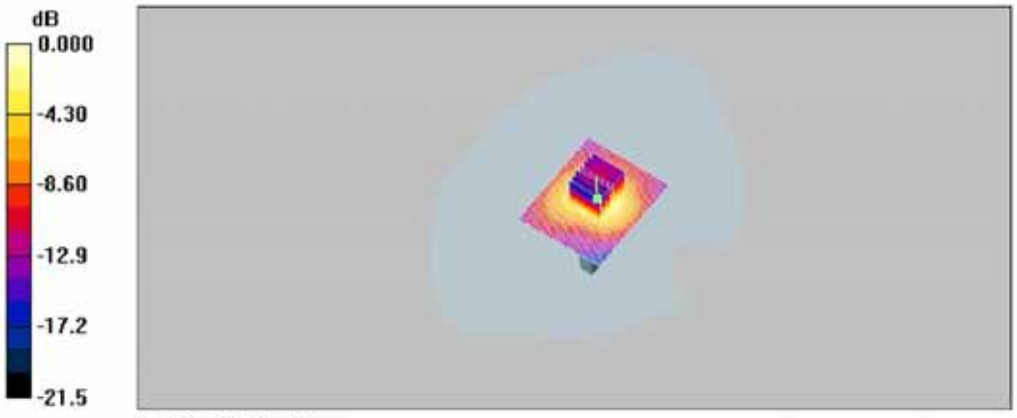
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900_Top_Mid_2Tx/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.141 mW/g

GPRS1900_Top_Mid_2Tx/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 0.262 W/kg
SAR(1 g) = 0.141 mW/g; SAR(10 g) = 0.073 mW/g
Maximum value of SAR (measured) = 0.162 mW/g



0 dB = 0.162mW/g

WCDMA V SAR Test

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: WCDMA V_Horizontal Up.da4

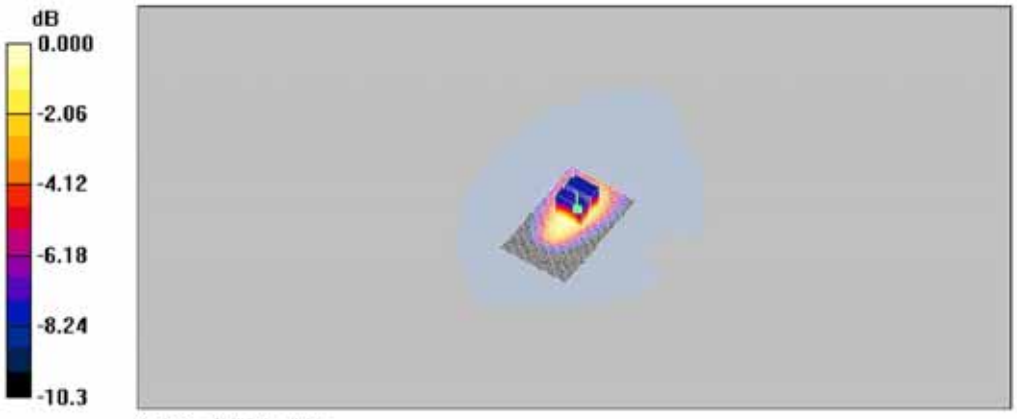
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA V_Body

Communication System: WCDMA V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

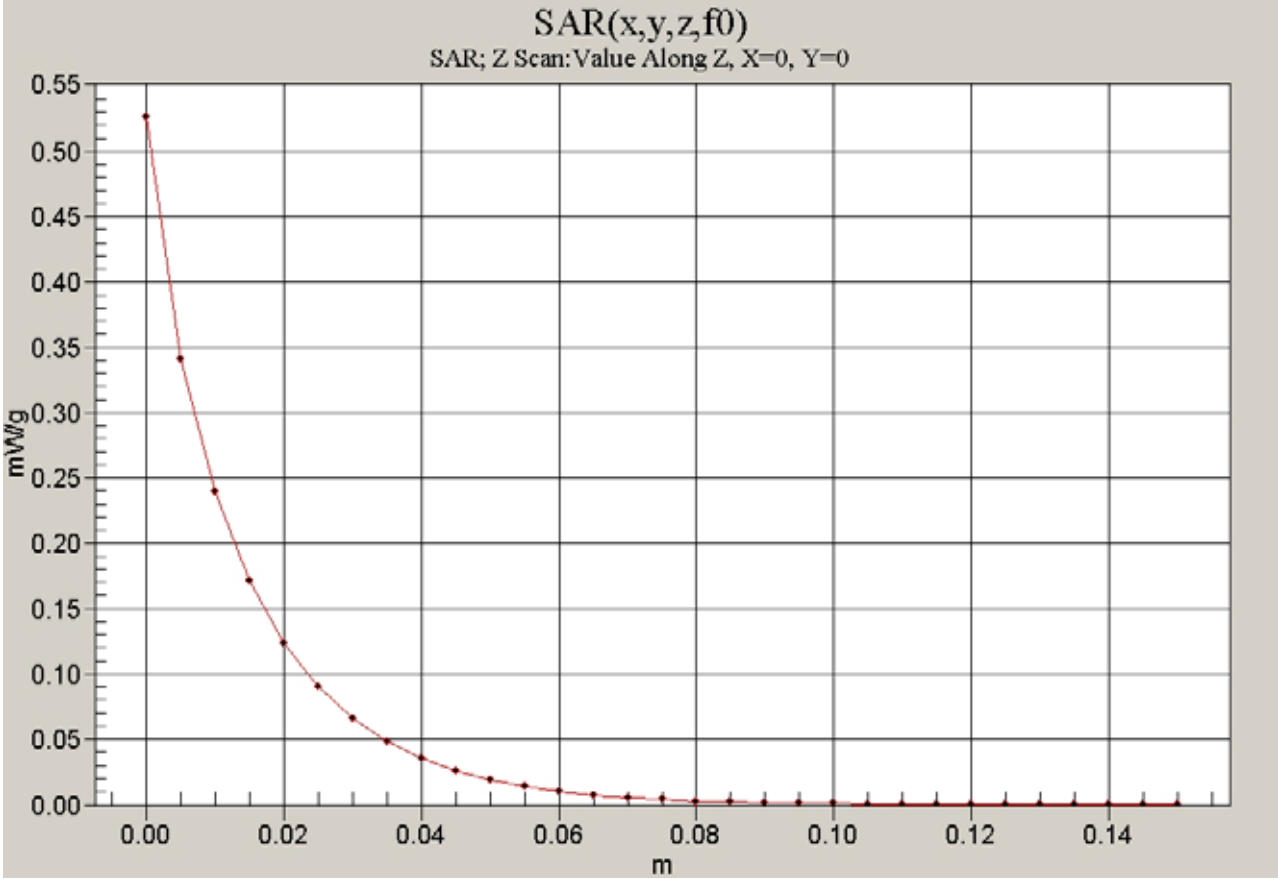
WCDMA V_Horizontal Up_Mid/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.494 mW/g

WCDMA V_Horizontal Up_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.5 V/m; Power Drift = -0.117 dB
Peak SAR (extrapolated) = 0.643 W/kg
SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.487 mW/g



0 dB = 0.487mW/g

Z scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: WCDMA V_Horizontal down.da4

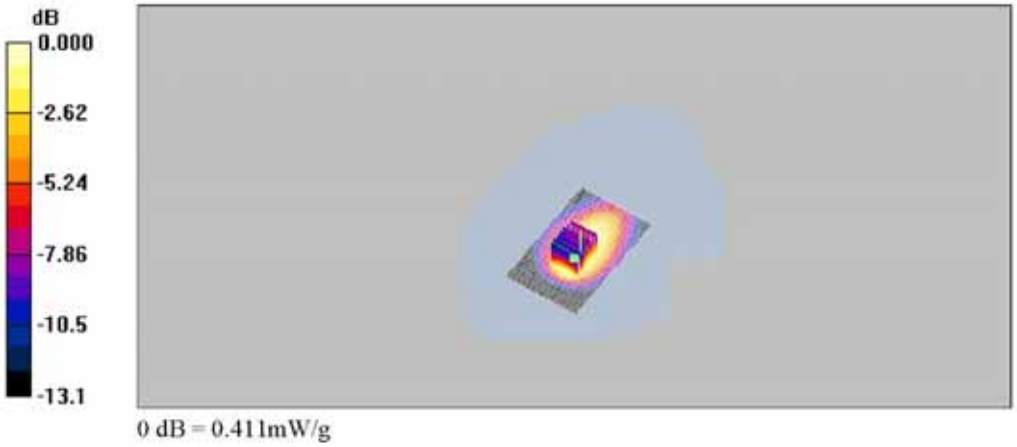
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA V_Body

Communication System: WCDMA V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA V_Horizontal Down_Mid/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.427 mW/g

WCDMA V_Horizontal Down_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.6 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.555 W/kg
SAR(1 g) = 0.385 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.411 mW/g



0 dB = 0.411mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: WCDMA V_Vertical Front.da4

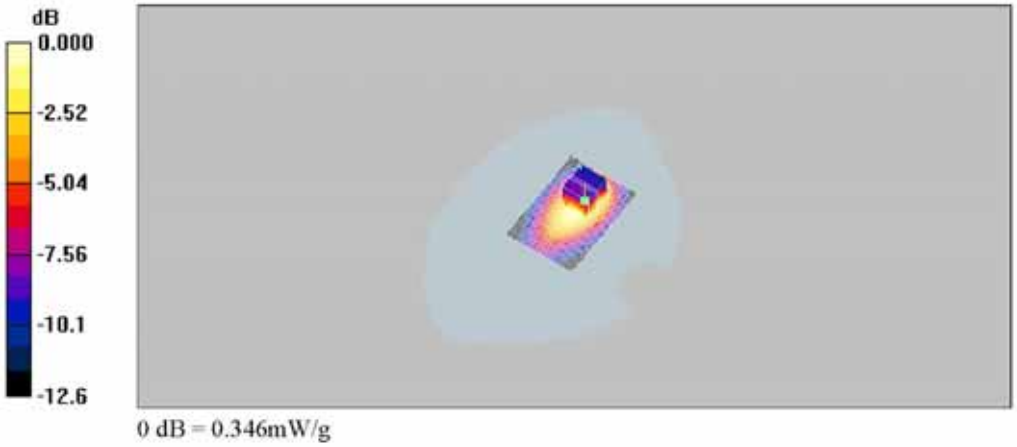
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA V_Body

Communication System: WCDMA V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA V_Vertical Front_Mid/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.345 mW/g

WCDMA V_Vertical Front_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 0.479 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.202 mW/g
Maximum value of SAR (measured) = 0.346 mW/g



0 dB = 0.346mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: WCDMA V_Vertical Back.da4

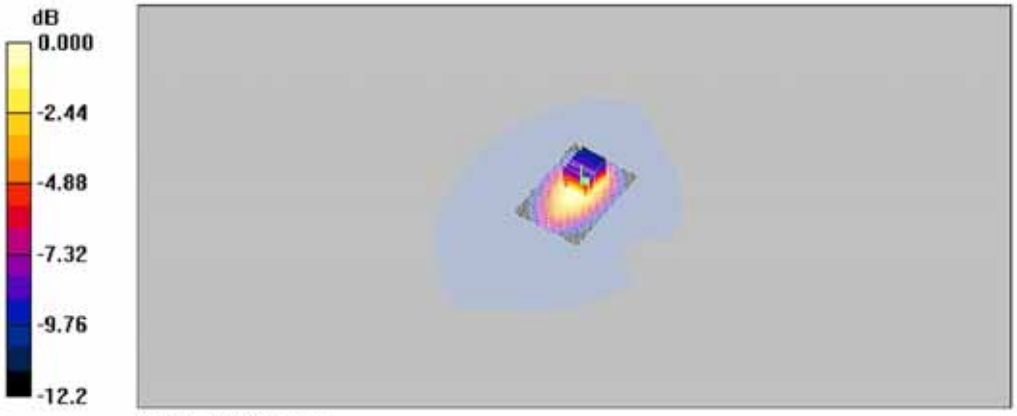
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA V_Body

Communication System: WCDMA V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA V_Vertical Back_Mid/Area Scan (51x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.425 mW/g

WCDMA V_Vertical Back_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.8 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.579 W/kg
SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.254 mW/g
Maximum value of SAR (measured) = 0.425 mW/g



0 dB = 0.425mW/g

Date: 2011-03-29

Test Laboratory: SGS Testing Korea
File Name: WCDMA V_Top.da4

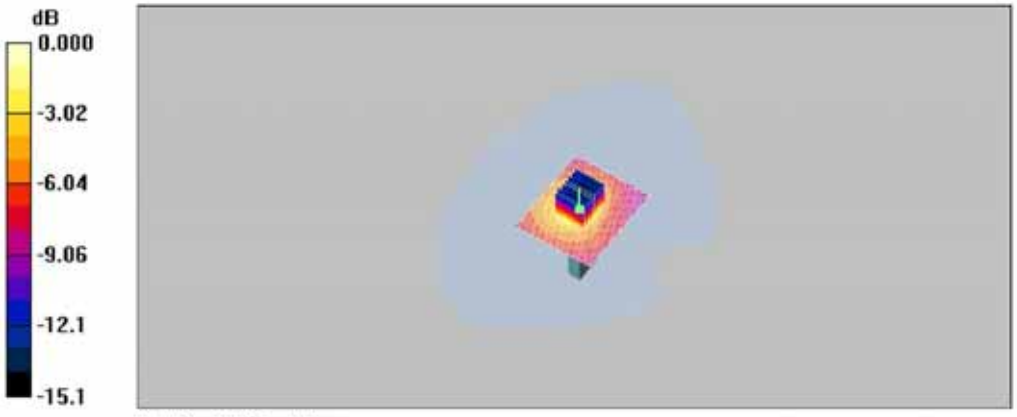
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA V_Body

Communication System: WCDMA V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.949 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.11, 6.11, 6.11); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP_900MHz; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA V_Top_Mid/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.106 mW/g

WCDMA V_Top_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.2 V/m; Power Drift = -0.147 dB
Peak SAR (extrapolated) = 0.392 W/kg
SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



0 dB = 0.127mW/g

WCDMA II SAR Test

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Horizontal Up.da4

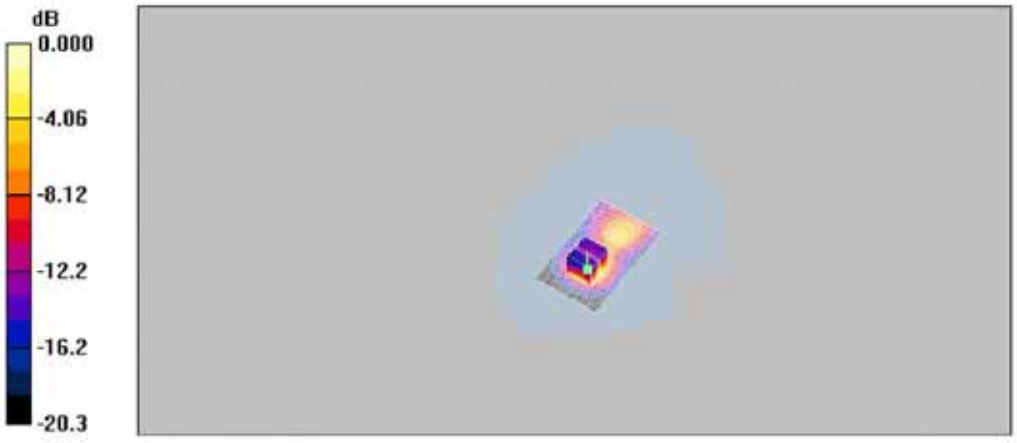
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.51 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Horizontal Up_Low/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

WCDMA II_Horizontal Up_Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.808 mW/g; SAR(10 g) = 0.407 mW/g
Maximum value of SAR (measured) = 0.919 mW/g



0 dB = 0.919mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Horizontal Up.da4

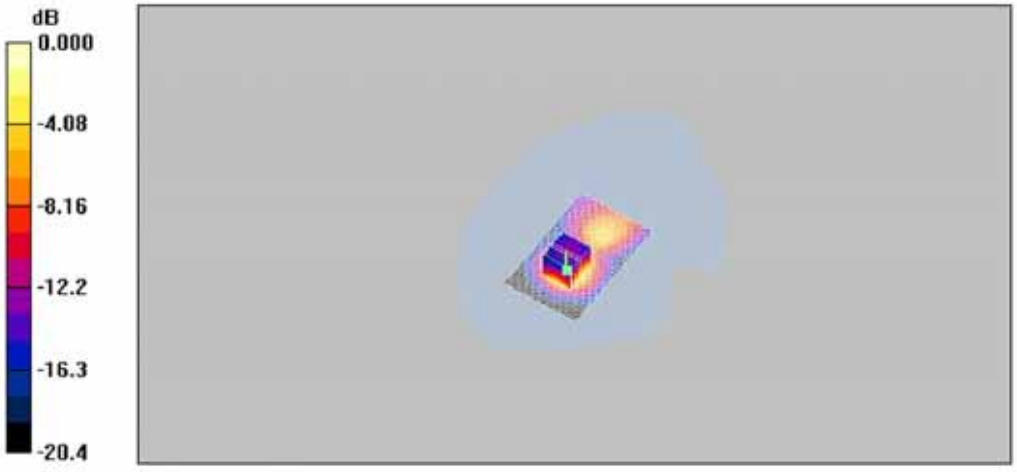
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

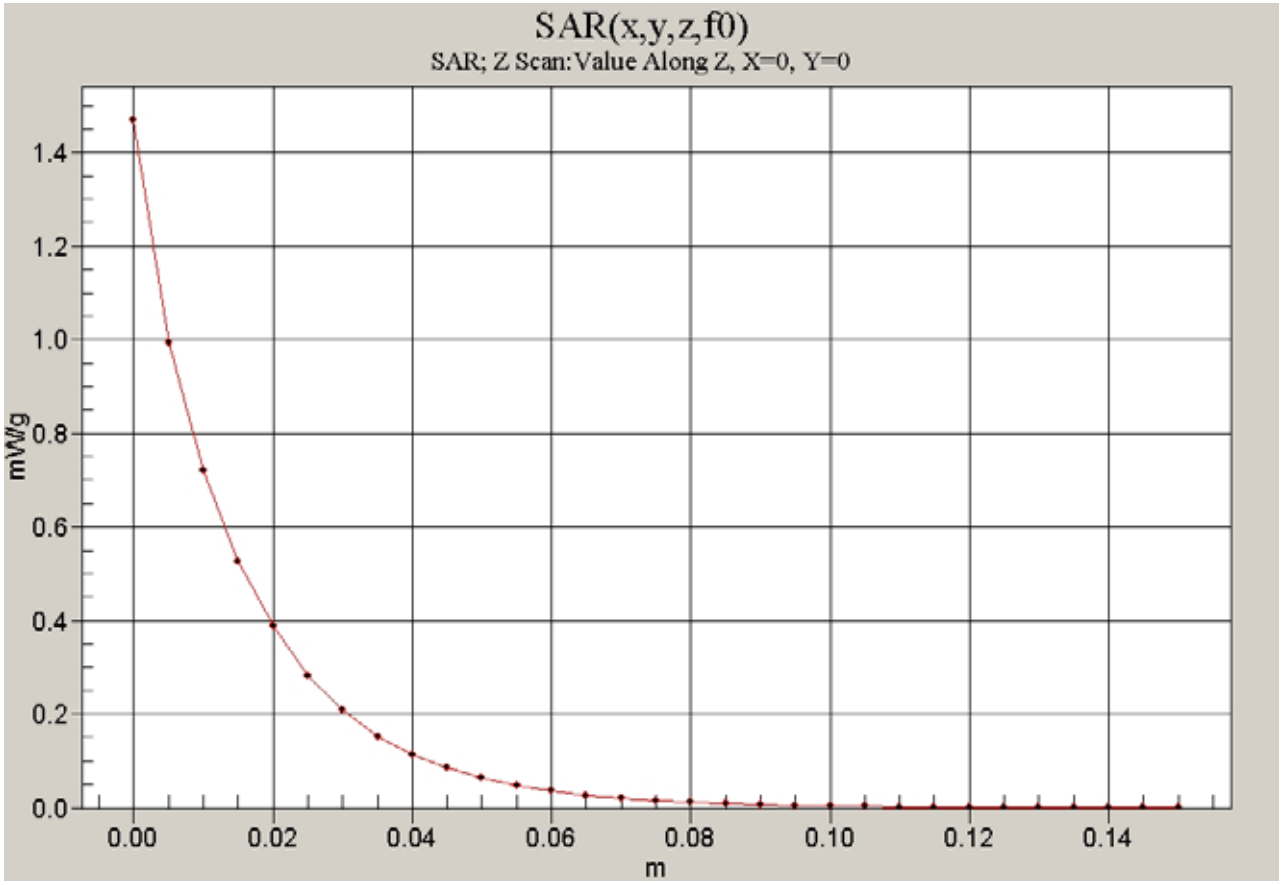
WCDMA II_Horizontal Up_Mid 2/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.68 mW/g

WCDMA II_Horizontal Up_Mid 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.4 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.650 mW/g
Maximum value of SAR (measured) = 1.48 mW/g



0 dB = 1.48mW/g

Z Scan


SAR(x,y,z,f0)
SAR; Z Scan:Value Along Z, X=0, Y=0
mW/g
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
m

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Horizontal Up.da4

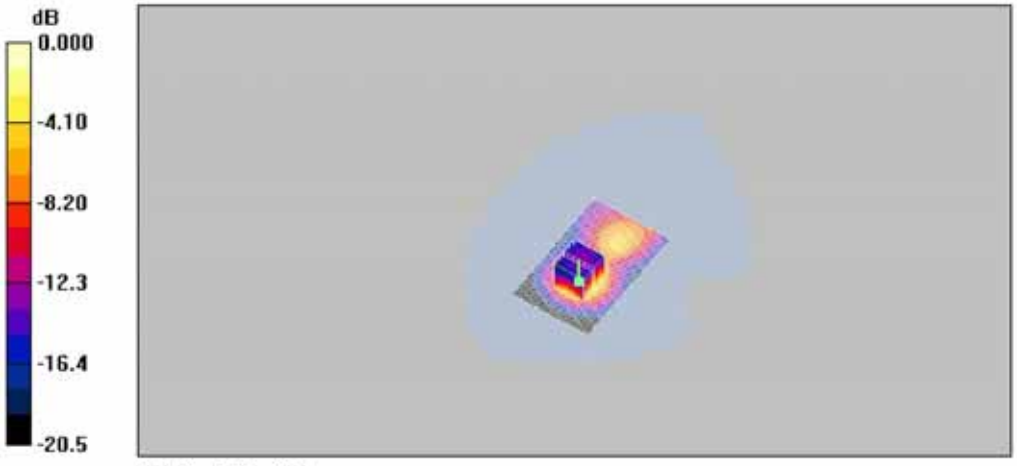
DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.57 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Horizontal Up_High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.63 mW/g

WCDMA II_Horizontal Up_High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 2.27 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.643 mW/g
Maximum value of SAR (measured) = 1.48 mW/g



0 dB = 1.48mW/g

Date: 2011-03-28

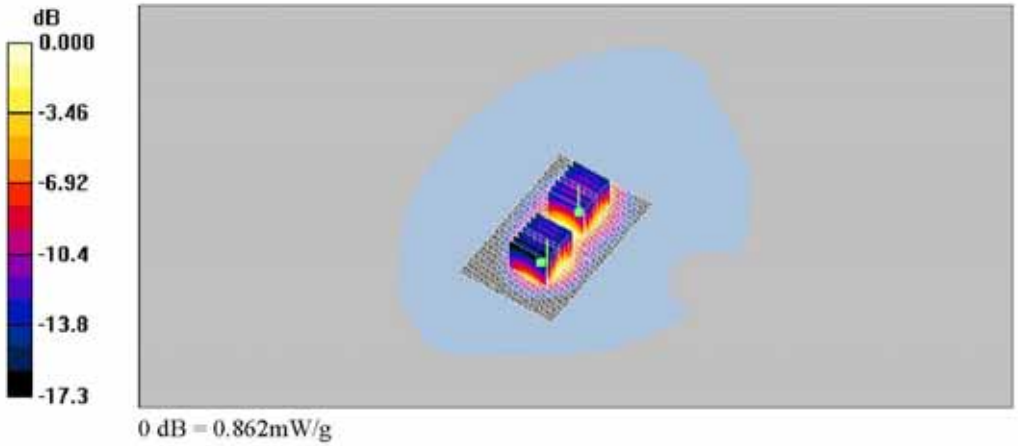
Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Horizontal Down.da4

DUT: C330; Type: USB Modem; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Horizontal Down_Mid/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.28 mW/g
WCDMA II_Horizontal Down_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.9 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.492 mW/g
Maximum value of SAR (measured) = 1.12 mW/g
WCDMA II_Horizontal Down_Mid/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.9 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.766 mW/g; SAR(10 g) = 0.421 mW/g
Maximum value of SAR (measured) = 0.862 mW/g



0 dB = 0.862mW/g

Date: 2011-03-28

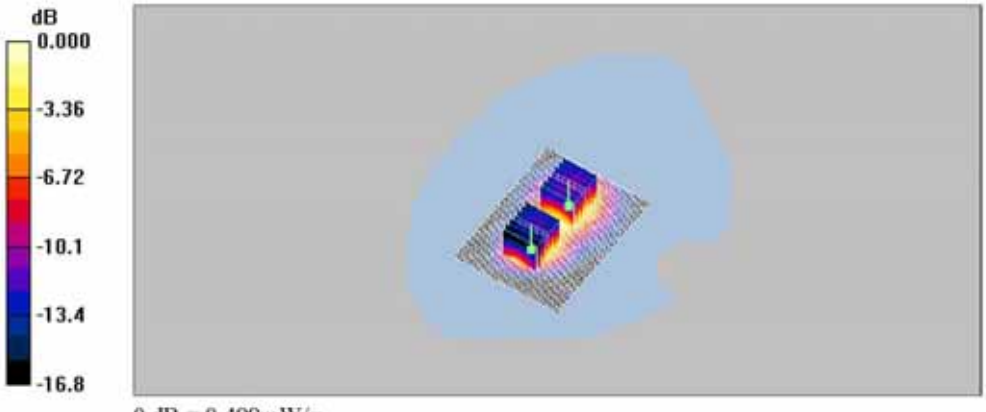
Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Vertical Front.da4

DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Vertical Front_Mid/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.740 mW/g
WCDMA II_Vertical Front_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.4 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.586 mW/g; SAR(10 g) = 0.284 mW/g
Maximum value of SAR (measured) = 0.665 mW/g
WCDMA II_Vertical Front_Mid/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.4 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 0.701 W/kg
SAR(1 g) = 0.448 mW/g; SAR(10 g) = 0.250 mW/g
Maximum value of SAR (measured) = 0.499 mW/g



0 dB = 0.499mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Vertical Back.da4

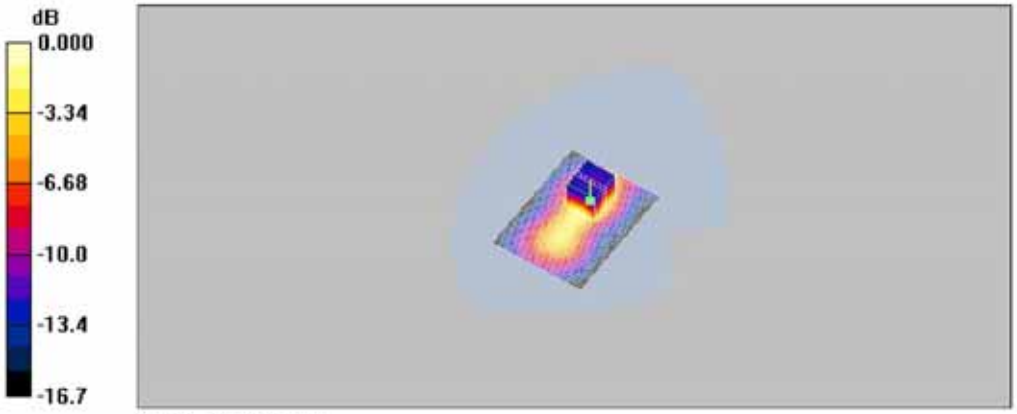
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Vertical Back_Mid/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.586 mW/g

WCDMA II_Vertical Back_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.7 V/m; Power Drift = -0.070 dB
Peak SAR (extrapolated) = 0.778 W/kg
SAR(1 g) = 0.486 mW/g; SAR(10 g) = 0.272 mW/g
Maximum value of SAR (measured) = 0.545 mW/g



0 dB = 0.545mW/g

Date: 2011-03-28

Test Laboratory: SGS Testing Korea
File Name: WCDMA II_Top.da4

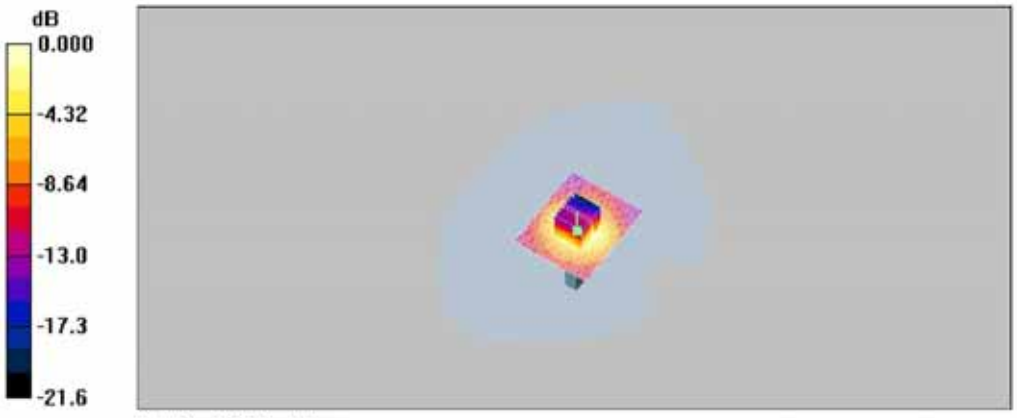
DUT: C330; Type: USB Modem_Vertical; Serial: N/A
Program Name: WCDMA II_Body

Communication System: W-CDMA II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.46, 4.46, 4.46); Calibrated: 2010-04-28
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2011-01-27
- Phantom: SAM MIC #2000-93 with CRP; Type: SAM MIC #2000-93; Serial: TP-1299
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA II_Top_Mid/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.219 mW/g

WCDMA II_Top_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.101 mW/g
Maximum value of SAR (measured) = 0.210 mW/g



0 dB = 0.210mW/g

Appendix B

Uncertainty Analysis

a	b	c	d	e = f(d,k)	g	i = cxg/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.3	N	1	1	6.30	∞
Axial isotropy	E.2.2	0.5	R	1.73	0.71	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	1.73	0.71	1.06	∞
Boundary effect	E.2.3	0.8	R	1.73	1	0.46	∞
Linearity	E.2.4	0.6	R	1.73	1	0.35	∞
System detection limit	E.2.5	0.25	R	1.73	1	0.14	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0	R	1.73	1	0.00	∞
Integration time	E.2.8	2.6	R	1.73	1	1.50	∞
RF ambient Condition -Noise	E.6.1	3	R	1.73	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	1.73	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	1.73	1	1.67	∞
Max. SAR evaluation	E.5.2	1	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	2.3	N	1	1	2.30	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	∞
Output power variation-SAR drift measurement	6.62	5	R	1.73	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31	∞
Liquid conductivity - deviation from target values	E.3.2	5	R	1.73	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	1.2	N	1	0.64	0.77	5
Liquid permittivity - deviation from target values	E.3.3	5	R	1.73	0.6	1.73	∞
Liquid permittivity - measurement uncertainty	E.3.3	1.1	N	1	0.6	0.66	5
Combined standard uncertainty				RSS		9.63	2754
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		19.27	

Appendix C

Calibration Certificate

- **PROBE**
- **DAE**
- **835 MHz DIPOLE**
- **1900 MHz DIPOLE**

- PROBE Calibration Certificate

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Accreditation No.: SCS 108

Client SGS-KES (Dymstec)

Certificate No: ET3-1782_Apr10

CALIBRATION CERTIFICATE

Object ET3DV6 - SN:1782

Calibration procedure(s) QA CAL-01.v6, QA CAL-12.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: April 28, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 28, 2010

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Engineering AG
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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1782

Manufactured:	April 15, 2003
Last calibrated:	April 30, 2009
Modified:	April 27, 2010
Recalibrated:	April 28, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1782

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.01	1.74	1.86	± 10.1%
DCP (mV)[B]	93.9	96.4	91.2	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ET3DV6 SN:1782 April 28, 2010

DASY - Parameters of Probe: ET3DV6 SN:1782

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	43.5 ± 5%	0.87 ± 5%	6.67	6.67	6.67	0.19	2.19 ± 13.3%
835	± 50 / ± 100	41.9 ± 5%	0.89 ± 5%	6.26	6.26	6.26	0.51	2.05 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	5.30	5.30	5.30	0.53	2.60 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.04	5.04	5.04	0.69	2.24 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.48	4.48	4.48	0.99	1.71 ± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1782 April 28, 2010

DASY - Parameters of Probe: ET3DV6 SN:1782

Calibration Parameter Determined in Body Tissue Simulating Media

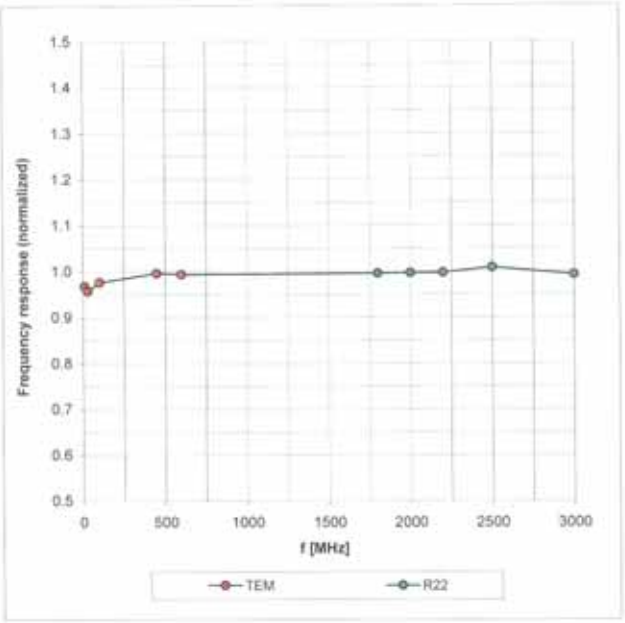
f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
450	± 50 / ± 100	56.7 ± 5%	0.94 ± 5%	7.53	7.53	7.53	0.15	2.33 ± 13.3%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	6.11	6.11	6.11	0.42	2.40 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	4.68	4.68	4.68	0.63	3.03 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.46	4.46	4.46	0.85	2.44 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.07	4.07	4.07	0.99	1.40 ± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1782 April 28, 2010

Frequency Response of E-Field

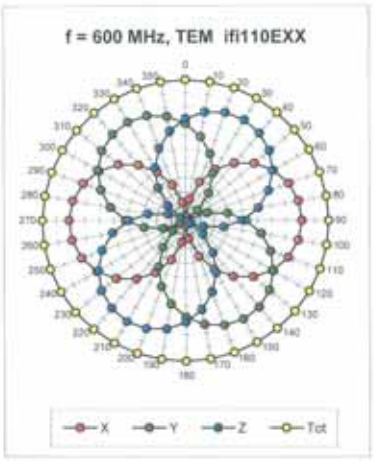
(TEM-Cell:ifi110 EXX, Waveguide: R22)

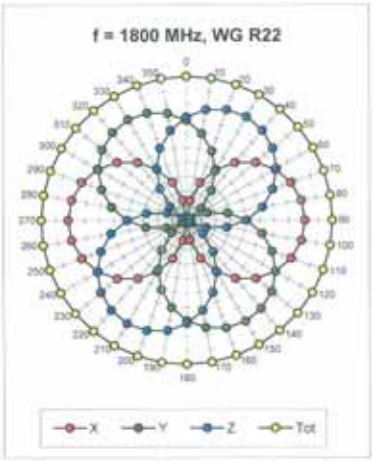


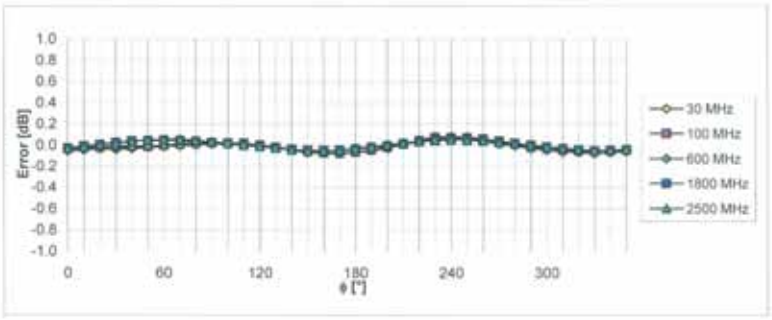
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1782 April 28, 2010

Receiving Pattern (ϕ), ϑ = 0°





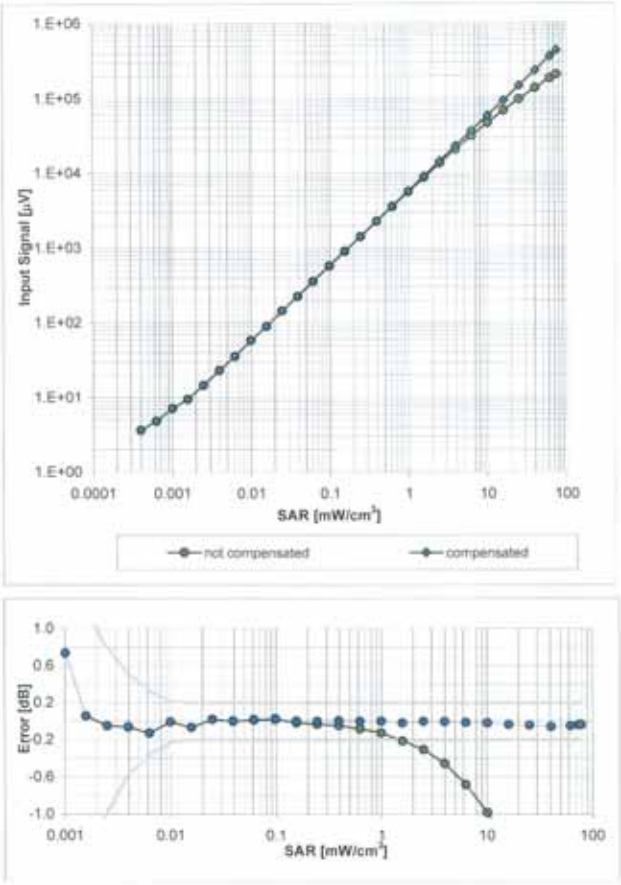


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6 SN:1782 April 28, 2010

Dynamic Range f(SAR_{head})

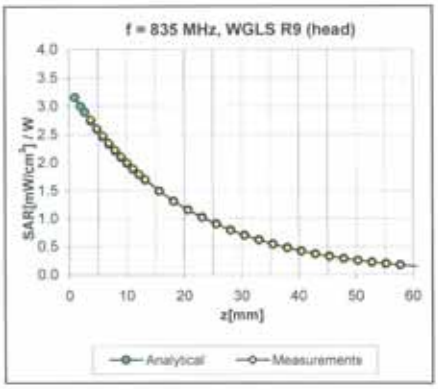
(Waveguide R22, f = 1800 MHz)

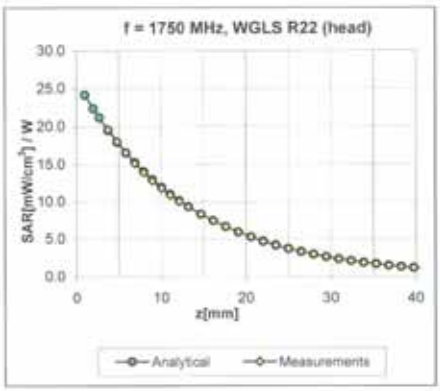


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ET3DV6 SN:1782 April 28, 2010

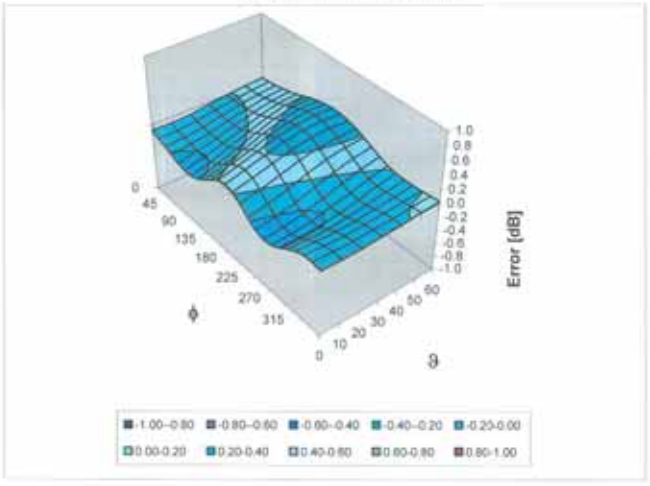
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

-DAE Calibration Certificate

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Accreditation No.: SCS 108

Client SGS (Dymstec)

Certificate No: DAE3-567_Jan11

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 567
Calibration procedure(s)	QA CAL-06.v22 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	January 27, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

	Name	Function	Signature
Calibrated by:	Andrea Guntli	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: January 27, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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Accreditation No.: SCS 108

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1µV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.644 ± 0.1% (k=2)	404.400 ± 0.1% (k=2)	404.475 ± 0.1% (k=2)
Low Range	3.94940 ± 0.7% (k=2)	3.96974 ± 0.7% (k=2)	3.94828 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	5.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200011.1	0.86	0.00
Channel X	+ Input	20005.53	5.63	0.03
Channel X	- Input	-19994.55	6.05	-0.03
Channel Y	+ Input	200012.0	3.19	0.00
Channel Y	+ Input	19998.16	-0.94	-0.00
Channel Y	- Input	-19999.31	0.89	-0.00
Channel Z	+ Input	200007.6	-0.57	-0.00
Channel Z	+ Input	20000.62	1.02	0.01
Channel Z	- Input	-19997.10	3.20	-0.02

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.6	-0.43	-0.02
Channel X	+ Input	200.86	0.86	0.43
Channel X	- Input	-198.93	1.07	-0.54
Channel Y	+ Input	2000.2	0.40	0.02
Channel Y	+ Input	200.07	0.07	0.03
Channel Y	- Input	-199.81	0.09	-0.05
Channel Z	+ Input	1999.8	-0.29	-0.01
Channel Z	+ Input	199.45	-0.75	-0.38
Channel Z	- Input	-200.35	-0.25	0.12

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	3.83	1.88
	- 200	0.20	-2.32
Channel Y	200	0.69	-0.01
	- 200	-1.13	-1.19
Channel Z	200	4.39	4.66
	- 200	-6.15	-6.31

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.13	-0.21
Channel Y	200	3.01	-	3.24
Channel Z	200	1.69	-1.11	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16333	16454
Channel Y	16169	16436
Channel Z	15951	16115

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.23	-1.40	0.68	0.42
Channel Y	-0.84	-2.05	0.49	0.41
Channel Z	-0.76	-1.62	0.54	0.38

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

- 835 MHz Dipole Calibration Certificate

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Accreditation No.: SCS 108

Client SGS KES (Dymstec)

Certificate No: D835V2-490_May10

CALIBRATION CERTIFICATE

Object D835V2 - SN: 490

Calibration procedure(s) QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: May 21, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 21, 2010

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Schmid & Partner
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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.62 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.29 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.2 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.84 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 mW / g
SAR normalized	normalized to 1W	6.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.47 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9 Ω - 5.3 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.4 Ω - 6.9 jΩ
Return Loss	- 21.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.381 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 19, 2003

DASY5 Validation Report for Head TSL

Date/Time: 21.05.2010 10:57:47

Test Laboratory: SPEAG, Zurich, Switzerland

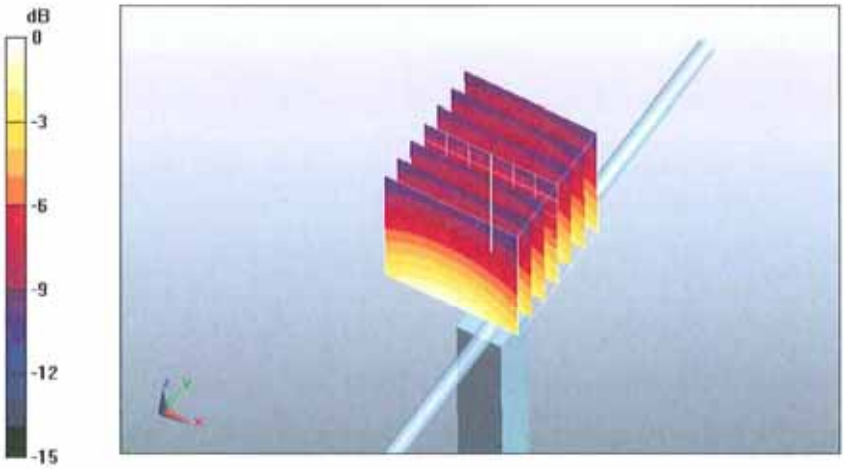
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

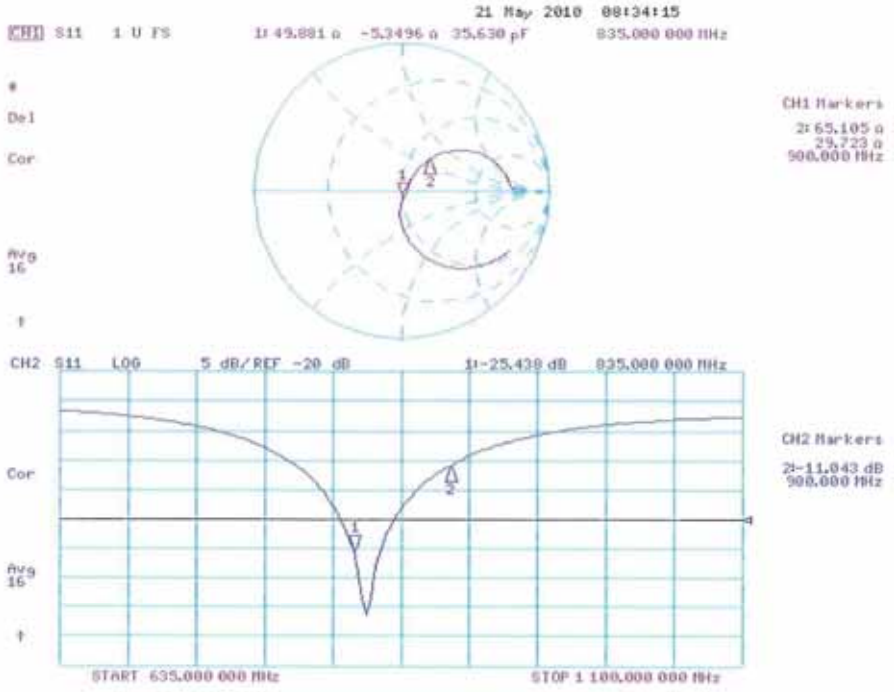
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = 0.00869 dB
Peak SAR (extrapolated) = 3.6 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.8 mW/g



0 dB = 2.8mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 20.05.2010 10:28:20

Test Laboratory: SPEAG, Zurich, Switzerland

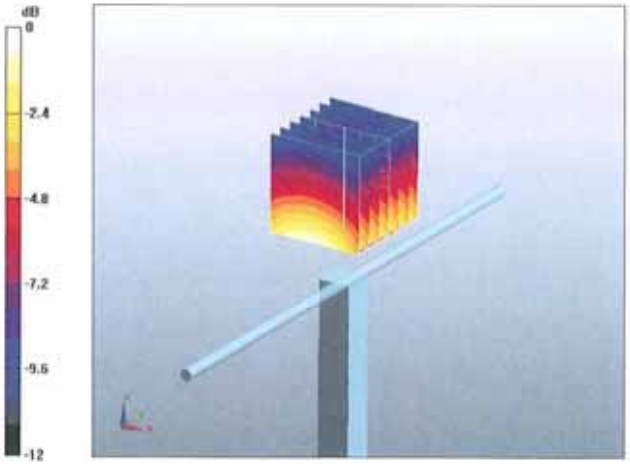
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

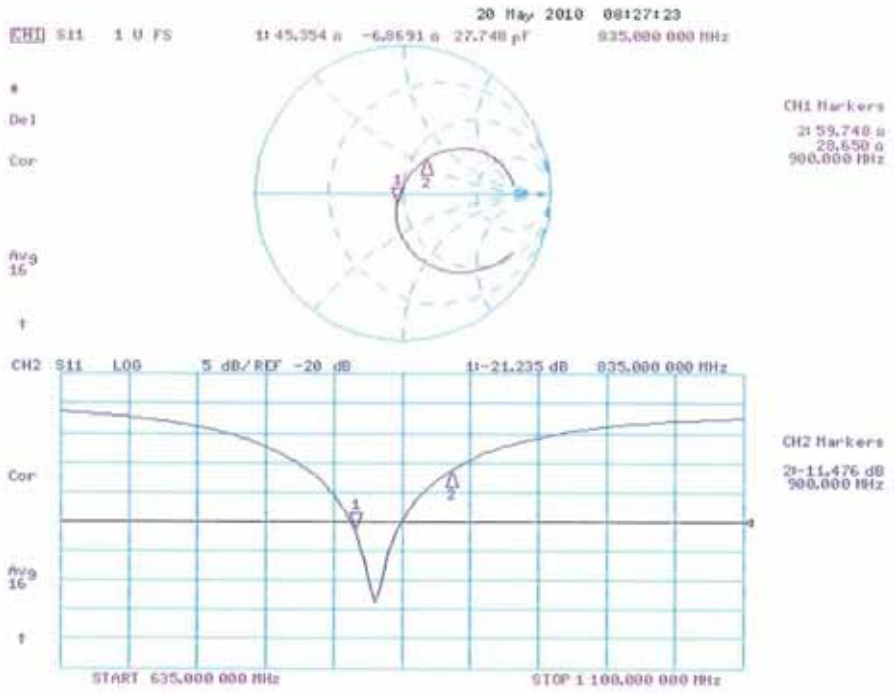
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = 0.000723 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.63 mW/g
Maximum value of SAR (measured) = 2.89 mW/g



0 dB = 2.89mW/g

Impedance Measurement Plot for Body TSL



- 1900 MHz Dipole Calibration Certificate

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client SGS KES (Dymstec)

Certificate No: D1900V2-5d033_May10

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d033
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	May 26, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 27, 2010

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.7 ± 6 %	1.41 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.90 mW / g
SAR normalized	normalized to 1W	39.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.15 mW / g
SAR normalized	normalized to 1W	20.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.1 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR normalized	normalized to 1W	41.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.3 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.50 mW / g
SAR normalized	normalized to 1W	22.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω + 3.8 jΩ
Return Loss	- 28.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1 Ω + 4.3 jΩ
Return Loss	- 25.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.205 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 17, 2003

DASY5 Validation Report for Head TSL

Date/Time: 17.05.2010 15:51:21

Test Laboratory: SPEAG, Zurich, Switzerland

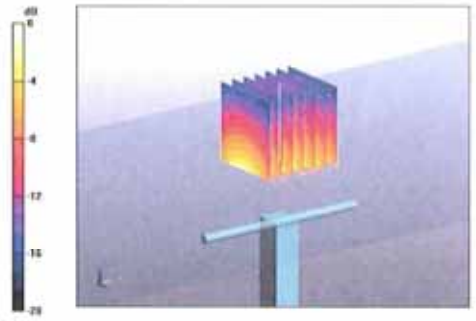
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

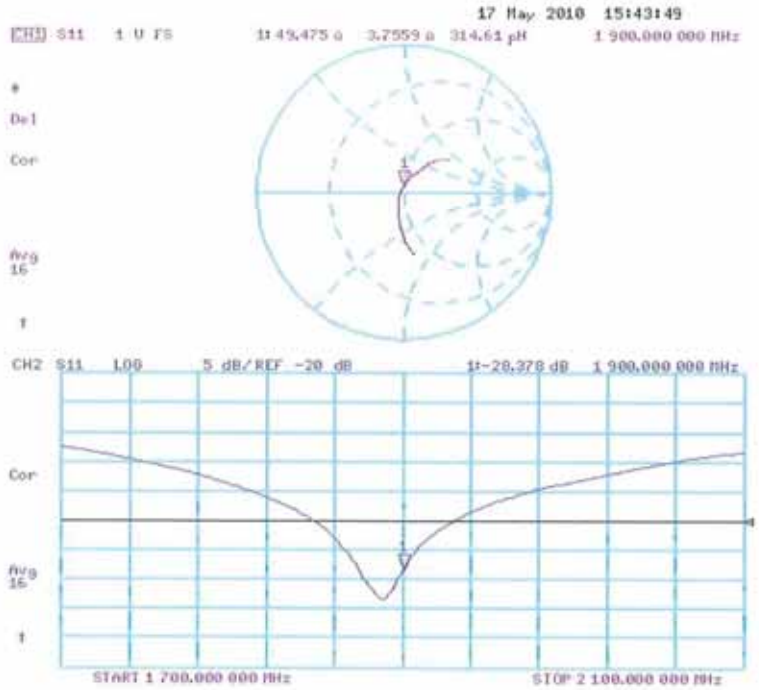
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.4 V/m; Power Drift = 0.00578 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.9 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 12.4 mW/g



0 dB = 12.4mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 26.05.2010 15:04:02

Test Laboratory: SPEAG, Zurich, Switzerland

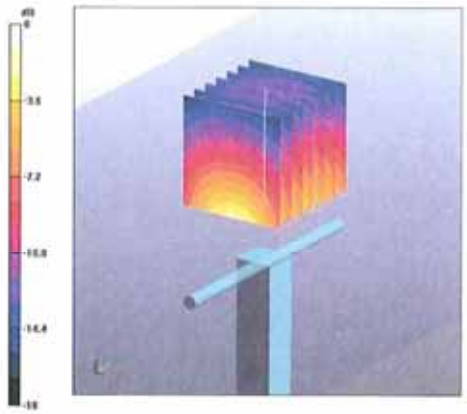
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.2 V/m; Power Drift = -0.00657 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.5 mW/g
Maximum value of SAR (measured) = 12.9 mW/g



0 dB = 12.9mW/g

Impedance Measurement Plot for Body TSL